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A Lecture
ON
ACCLIMATIZATION TO HIGH ALTITUDES.

Delivered to University College Medical Society, October, 1924,

BY

J. S. HALDANE, M.D., F.R.S.,
OXFORD.

The great physiological difficulties met with at very high altitudes in the Mount Everest expeditions, and so far conquered, have recently drawn much attention to acclimatization to high altitudes; but apart from this the phenomena of acclimatization, whether to high altitudes or to other unusual conditions of environment, are of the deepest biological interest and significance. In my book on *Respiration*, published two years ago, I discussed this subject piecemeal, but I wish to take this opportunity of reviewing it as a whole in the light of the additional facts revealed by the Mount Everest expeditions and the recent Anglo-American expedition to the Andes.

It was proved quite clearly by Paul Bert nearly fifty years ago that the abnormal symptoms experienced at very low atmospheric pressures, such as those existing at high altitudes, are due entirely to the low partial pressure of the oxygen in the air and consequent abnormally low partial pressure of the oxygen supplied to the tissues by the blood. It took about thirty years before the significance of his experiments and reasoning was generally understood by physiologists; but I think I need hardly go back upon this. He was also well aware that considerable acclimatization to low atmospheric pressure occurs; but as to the manner in which this acclimatization is brought about, or the extent to which it could be carried, his knowledge was limited.

Effects of Low Atmospheric Pressure on Unacclimatized Persons.

The effects of a temporary exposure to low barometric pressure can be studied conveniently in a steel chamber such as that originally employed for this purpose by Paul Bert. The air of the chamber is exhausted by means of a pump, and the pressure inside regulated by varying the amount of air which is allowed to leak in through a tap. We can also study these effects during ascents in balloons or aeroplanes, or after comparatively rapid ascents, whether on foot or otherwise, to high mountain altitudes.

On going within a few hours to a barometric pressure corresponding to an altitude of as little as five or six thousand feet we first begin to notice that any considerable exertion, such as walking uphill, is accompanied by unusual panting and increase of pulse rate. At three or four thousand feet higher this effect is much more marked, and is commonly accompanied by other more serious effects, showing themselves after a time even during rest. One of these effects is what is known as mountain sickness. Its chief symptoms are nausea, vomiting, and headache, though several hours of exposure are needed before they appear. With greater altitudes or depressions of barometric pressure these effects become more and more marked, and show themselves in more and more persons. More or less of blueness of the lips can also be observed, and various abnormal mental symptoms. Breathing also tends in many persons to become periodic, and sleep to be disturbed. When a pressure of only half an atmosphere is reached, corresponding to a height of about 18,000 feet, the acuity of vision and hearing begin to be distinctly affected, as well as the power of remembering the events which are happening and forming a clear judgement about them. This loss of sensory and mental power becomes more and more marked as the barometric pressure is further reduced, until at about 25,000 feet or less a condition of complete helplessness, accompanied by very marked blueness of the lips, is commonly produced after a quite short exposure. Power over the limbs, beginning with the legs, fails; the pulse and respirations become rapid but feeble; consciousness is lost; and the condition is one of impending death from failure in the depth of respiration.

Influence of Acclimatization.

These symptoms are wiped out completely if, by substituting oxygen for nitrogen in the rarefied air breathed, the fall in the partial pressure of oxygen in the air is prevented; but they can also be prevented or got rid of to a large extent by acclimatization. Persons who ascend gradually, day after day, to heights of 20,000 feet or more will probably never experience mountain sickness or any of the other more formidable effects of great altitudes; and persons who have gone rapidly to great heights and stayed there for several days will recover from the more formidable effects, provided they have not gone too high for acclimatization to occur before their death. The Mount Everest achievement of this year has shown that persons can even reach the height of 28,000 feet without mountain sickness.

Causes of Low Oxygen Pressure in the Arterial Blood.

In order to follow the means by which acclimatization is brought about we must first understand the means by which an abnormally low partial pressure of oxygen is produced in the tissues, and particularly those of the central nervous system. Paul Bert and others showed that whereas with a normal pressure of oxygen in the inspired air the arterial blood is bright scarlet and its haemoglobin almost completely saturated with oxygen during rest, it becomes more or less blue, with the haemoglobin imperfectly saturated, when the oxygen pressure of the inspired air is very low. This is due to the oxygen pressure in the arterial blood being no longer sufficient to permit combination of oxygen to a normal extent with the haemoglobin, since oxyhaemoglobin is easily dissociable. Thus the blood reaching the tissues has an abnormally low oxygen pressure. It may, and does, still contain abundance of dissociable oxygen to cover all the normal consumption of oxygen by the tissues; but the pressure of this oxygen is too low, and the observed symptoms are evidently due to the low oxygen pressure, and not to mere insufficiency in the amount of oxygen in the blood.

The most natural explanation of the low oxygen pressure in the arterial blood is that the oxygen pressure in the lung alveoli is correspondingly low, and that, since the passage of oxygen inwards depends, presumably, on simple diffusion, the arterial blood cannot be saturated to a higher oxygen pressure than that of the alveolar air. This reasoning, however, takes no account of acclimatization or of the fact that between the alveolar air and blood there is a thin layer of living protoplasm which might upset the reasoning altogether by actively driving oxygen inwards into the blood. The suspicion that this may be the case originated with Ludwig, and was transmitted by him to his pupil Christian Bohr of Copenhagen, and thence to a pupil of the latter—myself. It is pretty clear that Ludwig's idea was suggested by the experiments of Moreau, a French physiologist, on the physiology of active secretion of oxygen by the living wall of the swim-bladder. I have in my library Ludwig's own copy of one of Moreau's papers. Moreau's work was inspired by the remarkable discovery made at the beginning of last century by Biot, Pasteur's early master, that the swim-bladder may contain almost pure oxygen. In a deep-sea fish the pressure of oxygen may be five hundred times that in the surrounding sea-water. The secreting epithelial cells are thick and cubical, while the epithelial cells of the lung alveoli are extremely thin; but for secretory activity to be of great importance in the lungs it would only be necessary for the secreting cells to overcome an oxygen pressure of less than a four-thousandth of that overcome by the cells of the swim-bladder. In considering acclimatization to high altitudes I shall first discuss the evidence for and against active secretion of oxygen inwards, and its relation to acclimatization.

We must first distinguish the oxygen secretion controversy from another one relating to gaseous exchange in the lungs, and also emanating from Ludwig. He suspected that the process of oxygenation of blood in the lungs may help to expel carbon dioxide, and one of his pupils published experiments which gave some support to this idea.

With the help of the aerotonometer devised by Pflüger, evidence was, however, brought forward by the latter's pupils which seemed to negative Ludwig's idea. Bohr failed also to substantiate it. Finally, however, Christiansen, Douglas, and I, with the help of far better methods of blood-gas analysis, showed clearly, about eleven years ago, that Ludwig was right; and our results are now everywhere accepted, particularly as they explained how the aerotonometer experiments of Pflüger's pupils had been fallacious.[1]

Experiments with Aerotonometers.

It was Bohr who first, in 1891, brought forward definite experimental evidence in favour of the oxygen secretion theory.[2] He used an improved form of the Pflüger aerotonometer. The arterial blood, which was rendered incoagulable by the injection of peptone or leech extract, was allowed to flow for a short time alternately in and out of two glass vessels connected together above, and containing a gas mixture with which the blood came into contact, so that free diffusion could occur between the blood and gas mixture before the blood returned to the animal. It was found that although the pressure of oxygen in the gas mixture usually fell below that of the alveolar air, it occasionally rose distinctly higher. Bohr regarded these results as showing that active secretion of oxygen may occur in the lungs.

The investigation was then taken up by Fredericq.[3] Using a slightly simpler form of aerotonometer, permitting less interference with the animal's circulation, he found that, when sufficient time was given for complete diffusion equilibrium to occur between the gas mixture and arterial blood, the oxygen pressure in the gas of the aerotonometer was, in his experiments, always very considerably below that of the alveolar air. He therefore concluded that there is no real evidence for oxygen secretion, and that the apparent positive results of Bohr were due to experimental error. The results of Fredericq's experiments are definite and unmistakable, and they were fully confirmed by later experiments made by Krogh with a still better apparatus.[4] They certainly showed no evidence of oxygen secretion; but they had a further significance, which to my mind has emerged more and more clearly as our knowledge of respiration and the blood gases has increased. That significance is that neither the aerotonometer method nor the corresponding method of analysing the gases of arterial blood and calculating the oxygen pressure from the results is reliable in testing the theory of oxygen secretion.

On examining Fredericq's results we find that they give two values, one being the pressure of carbon dioxide, and the other of oxygen, in the arterial blood. For carbon dioxide the value corresponds to an excess of about 3 per cent. of carbon dioxide in air, while for oxygen it corresponds to a deficiency of about 8 per cent. If we assume, as we can do with practical certainty, that the pressure of carbon dioxide corresponded to the percentage of carbon dioxide in the alveolar air, it is quite impossible that the deficiency of oxygen can also have corresponded to the deficiency of oxygen in the alveolar air. The respiratory quotient would be a quite impossibly low one, particularly in some of the experiments. We thus seem at first sight driven to conclude, as Fredericq did, that even when an animal is at rest, and breathing pure air at ordinary pressure, the oxygen pressure in the blood and alveolar air may be far from coming into diffusion equilibrium with one another. But if this is so even during rest, what would happen during muscular exertion, when more than ten times as much oxygen has to be taken up from the alveolar air? The arterial blood would certainly be of a deep blue colour, which is not the case; and a simple calculation shows that the absorption of the amount of oxygen which is actually absorbed during muscular work at a high altitude would be quite impossible.

It is thus perfectly evident that in these experiments some cause was preventing the gas pressures in the arterial blood passing through the aerotonometer from representing the degree of equilibrium which is reached between the oxygen pressures in the alveolar air and blood passing through the alveoli, so that neither the aerotonometer method nor the corresponding method of inferring the oxygen pressure in the arterial blood from the degree of saturation with oxygen of the haemoglobin in it could possibly give reliable measurements relating to the question of oxygen secretion. We thought for long that this cause was most probably that during the period which elapses between saturation of the blood in the lungs and its passage through the aerotonometer, or into the blood-gas apparatus, a certain amount of oxygen enters into stable chemical combination. The real cause was, however, revealed quite clearly by the investigations published in 1919 by Meakins, Priestley, and myself on the effects of shallow breathing, and by the light which our results threw on the composition of arterial blood.[5]

Uneven Composition of the Alveolar Air.

We found that when the breathing is shallow, even if it is very rapid, and even if the oxygen percentage in the mixed alveolar air is above normal owing to great increase in the amount of air breathed with the rapid respirations, unmistakable symptoms of oxygen shortage are produced, and are promptly relieved by raising the oxygen percentage in the inspired air. The evident explanation of these facts is that the air in the different alveoli, instead of being uniform in composition as had formerly been assumed, varies in composition at different parts of the lungs. A sample of alveolar air, taken by the ordinary method introduced by Priestley and myself, represents, therefore, only the mean composition of the air in the deep alveoli. In some alveoli the oxygen percentage must be much lower than the mean and the carbon dioxide percentage higher, and conversely in other alveoli. With shallow breathing this irregularity is much exaggerated, owing to the uneven manner in which different parts of the lungs expand, as was pointed out by Sir Arthur Keith.

Owing to the different shapes of the dissociation curves of the oxyhaemoglobin and the bicarbonate, in the forms of which the oxygen and carbon dioxide in the blood are respectively combined, the irregularity will affect quite differently the partial pressures of carbon dioxide and oxygen in the mixed arterial blood. This can be seen at a glance on looking at the two curves, which are reproduced side by side in our paper. The carbon dioxide pressure in the mixed arterial blood will depend simply on the average carbon dioxide pressure in the alveolar air, since the effects on the blood of excesses of carbon dioxide in some alveoli are neutralized by those of the deficiencies in others. But a deficiency of oxygen brings the blood down the steeper part of the dissociation curve, while an excess brings it along the flatter part. The inevitable result is that the pressure of oxygen in the mixed arterial blood is lower, and may be far lower, than that of the mixed alveolar air. This effect will also, it can be seen, be much exaggerated in its effect on the percentage saturation of the mixed arterial blood with oxygen if the mean oxygen pressure in the alveolar air is low, as at high altitudes. An experiment of Krogh's on an animal breathing a low percentage of oxygen shows this clearly. We have thus a simple explanation of why, before acclimatization occurs, there is far more cyanosis than could otherwise be accounted for.

It is an entire mistake to suppose that this want of correspondence occurs only during shallow breathing, though it is much exaggerated by shallow breathing. Whether we use aerotonometers or the method of inferring the oxygen pressure of the arterial blood from the degree of saturation of the haemoglobin in it, as shown by blood-gas analysis, the result always is that under normal resting conditions the oxygen pressure of arterial blood is below that of the mixed alveolar air. In my own case, for instance, blood-gas analysis showed an oxygen pressure about 14 per cent. below that of the alveolar air. Perhaps no experiments bring the facts home to us more clearly than observations on the effects of holding the breath. If we distend the lungs with a deep breath of air, and then hold the breath as long as we can, we find, by repeating the experiment with air enriched with oxygen, that it is not merely excess of carbon dioxide, but also, as Leonard Hill and Flack first found, want of oxygen that has limited the time during which the breath can be held. With the enriched air the breath can be held far longer. Douglas and I found that the curtail-

ment still existed, although the mixed alveolar air at the breaking point contained more oxygen than normal, while Davies and Meakins proved by analyses of the arterial blood that at the breaking point the oxygen pressure in the arterial blood is far below that of the mixed alveolar air.

The Carbon Monoxide Method of Investigation.

The fact that it is quite impossible to obtain reliable results as to the presence or absence of oxygen secretion by the aerotonometer method, or by analysing the arterial blood, led me to introduce a quite different method of experiment. This method depends on the fact that oxygen and carbon monoxide compete with one another in accordance with a perfectly sharp and definite physical law when they both strive to enter into combination with the haemoglobin of the blood. The equilibrium which is reached depends on the relative pressures of the two gases, so that if we know (1) the percentage saturation of the blood with carbon monoxide when equilibrium is reached, and (2) the pressure of carbon monoxide, we can infer the pressure of oxygen. It is evident that by this method we can infer the mean pressure of oxygen, not in the mixed arterial blood, but in the unmixed blood leaving the lung alveoli. This is the method used, first by Lorrain Smith and myself; later, in an extremely careful series of experiments, by Douglas and myself with greatly improved technique[6]; and later still in the Anglo-American expedition to Pike's Peak by Douglas, Yandell Henderson, Schneider, and myself, for the investigation of acclimatization to high altitudes.[7] For further details of the method I must refer to the original papers, or to my book on *Respiration*. I need only give here the results which were reached.

Experiments at Normal Atmospheric Pressures.

We first investigated, partly on man and partly on mice, what happens under perfectly normal conditions at ordinary atmospheric pressure during rest. The experiments showed unmistakably that very exact diffusion equilibrium is reached between the oxygen in the aveolar air and that in the blood. This is what one would expect on purely physical grounds; and the experiments showed clearly the fallacy in the experiments of Fredericq, Krogh, and others who have inferred from experiments with the aerotonometer, or from analyses of arterial blood, that sensible diffusion equilibrium does not occur. The result is what one would expect on physiological grounds: for oxygen secretion, if it occurred, would be of singularly little use, since it could increase but little the normal saturation of the arterial blood with oxygen.

We then examined in mice what occurs in fairly prolonged exposure to the oxygen shortage of carbon monoxide poisoning. The result was that as the oxygen shortage increased the mean oxygen pressure in the blood leaving the alveoli gradually rose high above that of the alveolar air and even the inspired air. With oxygen shortage produced rapidly in man by lowering the percentage of oxygen in the inspired air the oxygen pressure in the blood leaving the alveoli rose only very slightly above that in the alveolar air. This is in good agreement with the fact that acclimatization to the low oxygen pressure in the air at a high altitude requires a considerable time.

Our next step was to examine what happens during muscular exertion. It is during muscular exertion that we should expect to find oxygen secretion coming into play. The reason for this inference is that during hard muscular exertion shortage of oxygen occurs very readily, and this shortage, in so far as it affects the breathing, must be due to deficient saturation of the arterial blood with oxygen. The breathing during hard muscular exertion becomes usually of the type produced, not by mere excess of carbon dioxide, but by a combination of this with shortage of oxygen. In other words, the rate of breathing and volume of air breathed increase out of proportion to the rise of carbon dioxide in the alveolar air, and finally the percentage of carbon dioxide in the alveolar air falls below normal. We have also now direct evidence, first obtained by Harrop, that with hard enough work there is a great fall in the oxygen pressure of the arterial blood. Further indirect evidence is furnished by the fact that the doing of very hard work is greatly facilitated by air in which the percentage or pressure of oxygen is raised.

The physiological function of oxygen secretion (if it occurs) during muscular work is presumably to prevent or diminish the fall which would otherwise occur in the oxygen pressure of the arterial blood. Hence it is not to be expected that an actual rise above that of the alveolar air will occur readily during muscular work when active secretion occurs. On the other hand, it is evident from our observations of oxygen secretion in connexion with carbon monoxide poisoning that the stimulus to oxygen secretion originates in the tissues, not in the lungs, and is probably due to some substance carried to the lungs, or possibly the central nervous system, from tissues which are short of oxygen. Hence we thought that the best chance of producing an actual rise of oxygen pressure in the blood leaving the alveoli would be to do exhausting work with only one arm, so as to furnish the stimulus to secretion without at the same time so raising the consumption of oxygen in the body as to occasion, apart from secretion, any appreciable fall in the oxygen pressure of the arterial blood. Our expectations were justified, and we found a very considerable rise in the mean oxygen pressure of the blood leaving the alveoli over that of the alveolar air. This occurred in every experiment, and was quite unmistakable. It seems probable that the occasional positive result in Bohr's experiments depended on stimuli arising from interference with the circulation in his method of experiment.

If the response to want of oxygen by oxygen secretion in the lungs is a normal response we should expect to find that it becomes more ready and powerful with use, just as other functions are improved by use. Evidence on this point has been furnished by a series of observations made by Professor Briggs of Edinburgh.[8] While experimenting with mine-rescue apparatus, during the use of which air greatly enriched with oxygen is breathed, he found that men who are in good muscular training receive hardly any benefit from the enriched air during comparatively hard muscular work. Men who are not in training receive, on the other hand, great benefit—a fact which is well known to me from personal experience. The difference can be measured easily by analyses of the expired air or alveolar air, and these are evidently a good test of physical training. It thus seems evident that a man in good physical training can prevent shortage of oxygen in his arterial blood; and active secretion of oxygen is the only known means of doing this.

Experiments on Pike's Peak.

The final experiments were made during our stay of some weeks on the summit of Pike's Peak at a height of 14,000 ft. The results were again quite definite. The mean oxygen pressure of the blood leaving the alveoli was found to be, after, but not before, acclimatization had occurred, at least 50 per cent. higher than in the alveolar air, and only a little lower than at sea level. Let us see what this result did, and did not, mean. It meant that the mean oxygen pressure of the blood leaving the lung alveoli was 50 per cent. higher than in the alveolar air, but certainly not that the mixed arterial blood as we find it in an artery or in blood taken from an artery had almost a normal oxygen pressure or saturation with oxygen. The whole of the phenomena of acclimatization are dependent on the continued stimulus of oxygen shortage in the blood, as we said again and again in the Pike's Peak report.

We thought at the time when the report was written that the shortage was almost entirely due to increased oxidation in the blood during the period which elapsed between its leaving the lungs and reaching the tissues; for we did not then know of the irregularity of the composition of the air in the lung alveoli and the consequences of this which I have already pointed out. With a lowered partial pressure of oxygen in the inspired air these consequences must, of course, be far more marked, as already remarked; and this accounts for the very marked blueness of unacclimatized persons on Pike's Peak. Meakins, Priestley, and I found that in neurasthenic cases suffering from the nervous disturbance of respiration, which makes the breathing

abnormally shallow and rapid (so-called "D.A.H." or "disordered action of the heart"), even a slight diminution of atmospheric pressure, such as produced no appreciable reaction whatever in normal persons, produced the most urgent symptoms when these patients were tested in a steel chamber.

In the persons carefully observed on Pike's Peak—at least in the cases of Douglas, Yandell Henderson, and myself—the shortage of oxygen in the arterial blood was so slight after acclimatization that we could observe no diminution at all in the normal redness of the lips, though we were all very distinctly blue in the lips during the day or two which elapsed before acclimatization, when we were still suffering from mountain sickness. In the many persons who came up temporarily by train, on donkeys, or on foot, the blueness was also nearly always well marked, and sometimes not only extreme, but accompanied by clouding, or even complete temporary loss of consciousness. In unacclimatized persons who were walking up along the railway track and who were not in physical training the cyanosis during the exertion became extreme, and rests were necessary every few steps.

It is well known to mountaineers that persons who are in good training are much less susceptible to mountain sickness than others. In the light of Briggs's observations and their interpretation we can now understand this readily, for persons in good training are also ready to secrete oxygen.

Increased Percentage of Haemoglobin at High Altitudes.

I must now pass on to the discussion of other factors in acclimatization. The best, and longest, known of these is increase in the percentage of haemoglobin in the blood. This must help in the following manner. With a higher percentage of haemoglobin in the blood there must be, other things being equal, a larger store of dissociable oxygen in the arterial blood. This is of no direct help in combating the symptoms, which, as we have already seen, are due to deficiency in the partial pressure of the oxygen; but it must help indirectly in the following manner. With a given disappearance of free oxygen in the tissues the pressure of oxygen will not fall so low if there is an increased proportion of haemoglobin in the blood. In this indirect way the mean pressure of oxygen will be kept higher, and it is the pressure of oxygen round the living tissues, and not merely in the arterial blood, that matters.

The extent and the rapidity with which the haemoglobin percentage in the blood increases in different individuals are very variable; and the more essential physiological changes during acclimatization may be almost complete before there is much increase in the haemoglobin. The mean percentage of haemoglobin, however, increases quite regularly with fall in barometric pressure, as was shown by Miss FitzGerald. The importance of increase in the haemoglobin percentage was formerly much exaggerated, at a time when the other more decisive factors in acclimatization were not yet understood; but in the long run, and at very high altitudes, increase of haemoglobin is probably of considerable indirect importance.

Increased Breathing at High Altitudes.

I now come to a factor which is certainly of very great importance. Those not familiar with the physiology of respiration and circulation might easily imagine that in order to combat the effects of defective saturation of the arterial blood with oxygen what is chiefly necessary is merely to increase the amount of air breathed, for by this means the pressure of oxygen in the alveolar air and arterial blood can be raised considerably. It is evident also that in persons under greatly reduced atmospheric pressure, whether they are acclimatized or not, the breathing is much increased; and mere increase in breathing is thus apt to be taken as a sign of acclimatization. But we know now how amazingly delicate is the normal regulation of the hydrogen-ion concentration of the blood, and that this regulation is at once upset with serious effects if, by unnaturally increased breathing, too much carbon dioxide is washed out of the blood. Under the stimulus of want of oxygen the breathing tends to be increased; but this, by washing out carbon dioxide, makes the blood and whole body more alkaline—in other words, produces a state of alkalosis; and since the normal regulator of respiration is increase or diminution in the hydrogen-ion concentration round the respiratory centre or centres, the increase in breathing from the direct action of want of oxygen is limited, though just at first, before the alkalosis has developed fully, it may be very considerable. The alkalosis also tends to diminish the circulation rate and thus prevent relief which might otherwise be brought by an increase in the circulation rate and consequent rise of oxygen pressure in the tissues.

Although during acclimatization the oxygen pressure of the arterial blood is rising, as already explained, the breathing continues for many days to increase, as shown by the continued fall in the pressure of carbon dioxide in the alveolar air. This increase in breathing cannot, therefore, be due merely to want of oxygen. We followed it closely on Pike's Peak, and in our report attributed it to the gradual development of an acidosis owing to a special action of want of oxygen in stimulating the kidneys to excrete alkali. We had not then realized the alkalosis produced by the slightly increased breathing owing to the stimulus of want of oxygen.

The true facts were revealed in an investigation carried out in steel chambers in London by Kellas, Kennaway, and myself shortly after the war.[9] We found that during the want of oxygen which is immediately produced by exposure to low atmospheric pressure the urine becomes alkaline or much less acid and the amount of ammonia in the urine diminishes greatly, just as in any ordinary alkalosis produced by forced breathing or ingestion of alkali. In other words, the kidneys and formation of ammonia in the body were reacting normally to an alkalosis. The increase in breathing during the process of acclimatization is thus due, not to an acidosis, but to the gradual compensation in a normal manner of an alkalosis produced by the slightly increased breathing caused directly by want of oxygen. As the alkalosis becomes compensated the full effect on the breathing of the slight oxygen-want is unmasked more and more, even though the oxygen-want itself is continuously diminishing as acclimatization advances. In this connexion I should like to point out that the regulation of the reaction in the body is an active physiological process, and not, as the confused accounts in many textbooks and papers seem to represent, a mere result of the physico-chemical buffering in body fluids, blood corpuscles, etc.

We can thus see why it is that with acclimatization at higher and higher altitudes the breathing during rest is more and more increased, just as in a true acidosis. On Pike's Peak the increase was only about 50 per cent.; but on the higher slopes of Mount Everest it would be at least 100 per cent. Graphs constructed by Miss FitzGerald from her observations in connexion with the Pike's Peak expedition in various villages or towns of the Rocky Mountains and elsewhere show the mean decreases in alveolar carbon dioxide pressure and oxygen pressure at different altitudes, together with the increases in haemoglobin percentage. These graphs, which are reproduced in my book on *Respiration*, give us a clear idea of the probable increase in the breathing and haemoglobin during the Mount Everest expedition. But for the tragic death of Dr. Kellas from, as appears to have been the case, want of oxygen owing to failure of acclimatization during illness, we should by this time have had far fuller information on the increase of breathing and haemoglobin at great altitudes.

An increase of 100 per cent. in the breathing during rest is noticeable enough, but not uncomfortable. But when the breathing during muscular exertion, such as walking or climbing, is also, as must happen in persons acclimatized at high altitudes, increased by at least 100 per cent., the distress caused becomes very great, and at once limits the exertion. I have for long been familiar with this in connexion with observations of the effects of carbon dioxide in mines and submarines, and on divers. Owing to a recent discovery by my son, we can now reproduce this phenomenon by causing acidosis in a healthy person breathing ordinary air at sea level.[10] I confess that when he first produced

the acidosis on himself I was almost ashamed to walk with him at a leisurely pace along the streets of Oxford, for he was panting so hard as to attract everyone's attention.

We found on Pike's Peak that some part of the greatly increased breathing on considerable exertion was due to the immediate effects of want of oxygen; but comparatively little. Air enriched with oxygen would not give more than very partial relief to the breathing in a person acclimatized to a high altitude; and the benefit might be more than neutralized by the inconvenience caused by the weight of the apparatus. In the case of a person not acclimatized, however, the relief to all the symptoms would be complete if the oxygen was sufficient. He would breathe during exertion just as easily as at sea level; but if he were not acclimatized, and the apparatus failed at an altitude of about 25,000 ft. or even less, he would certainly perish. The cause of death would be a fatal combination of oxygen-want and alkalosis; and the immediate cause would, to judge from our observations in steel chambers, be failure in the depth of breathing.

Acquired Toleration of the Tissues to Low Oxygen Pressure.

I now come to a fourth factor in acclimatization. This factor, as it seems to me, has been revealed by the recent Anglo-American expedition to a high altitude in Peru under Mr. Barcroft's leadership.[11] The Peru expedition differed from that to Pike's Peak owing to the fact that observations could be made on persons who were natives of the place, or who had been acclimatized for long periods. Owing to improved technique, analyses could now also be made of the gases in arterial blood. The new factor is that persons who have been long acclimatized become able to exist normally with a considerably lowered pressure of oxygen in the arterial blood. Apparently the tissues themselves become acclimatized to the lowered oxygen pressure, and this, of course, diminishes the stimulus to secretion. At any rate, numerous individuals were found who were living healthily with their lips and skins of an abnormally bluish tinge, and who became very distinctly pinker when they were moved to a lower altitude or breathed air enriched with oxygen. The haemoglobin of their arterial blood was found to be only about 83 per cent. saturated with oxygen, whereas such a low saturation, if it were produced rapidly, as in patients with certain acute lung affections, would be indicative of danger to life.

We are familiar clinically with what appears to be a similar phenomenon, and I have referred to it in my book on *Respiration*. We see persons with chronic emphysema, or certain chronic heart affections, going about and leading a fairly normal life with their lips and skin more or less blue; and there is no doubt that in many of these cases the blueness depends on imperfect saturation of the arterial blood with oxygen, and that the patients in question have become acclimatized to it. This fact has for long obscured the deadly significance of any appreciable degree of arterial cyanosis in ordinary patients who are not gradually acclimatized, and the urgent need, so strongly emphasized recently by Meakins, of combating the cyanosis by continuous enrichment of the inspired air with oxygen, or by any other means.

We observed no such cases among acclimatized persons in the Pike's Peak expedition; but this was probably due to the very limited number of persons observed, and the fact that the duration of acclimatization had been so short, or the acclimatization so perfect. Had we been able to analyse the arterial blood we should certainly, however, have found a distinct diminution in the normal saturation with oxygen, and a corresponding considerable diminution in the arterial oxygen pressure; for had this not existed the whole of the phenomena would have been quite unintelligible, as already pointed out. In the case of Meakins there was, after acclimatization in the Peru expedition, a diminution of 4 per cent. in the arterial saturation, and this small difference is just about what we should have expected from the Pike's Peak results.

The Inferences of Mr. Barcroft and Professor Krogh.

In his report on the expedition Mr. Barcroft draws what seems to me to be the amazing inference that the blood-gas analyses indicated that no active secretion of oxygen exists. I have already given the evidence that it is practically impossible to decide this question directly by means of either aerotonometers or blood-gas apparatus, together with a summary of the evidence, both direct and indirect, in favour of the secretion theory. It seems to me that without a shadow of doubt this theory still holds the field completely, though I am sorry to have to differ so emphatically from Mr. Barcroft, to whom physiology owes so much. The secretion theory rests not merely on the direct evidence furnished by the carbon monoxide method, but also on a mass of indirect evidence, part of which I have summarized. The blood-gas analyses on members of the Peru expedition seem to me, when these analyses are interpreted in the light of existing knowledge, to afford very strong evidence in favour of the secretion theory; but it is much to be regretted that the carbon monoxide method was not employed. The details of the analyses bear out, up to the very hilt, the conclusions of the Pike's Peak expedition. The only observations which at first sight seem to bear out the diffusion theory are the results of determinations by a modified aerotonometer method of the oxygen pressure of arterial blood at sea levels. These results are, however, quite inconsistent with the aerotonometer results for animals, and were, I am confident, erroneous for reasons which can be surmised easily.

Not only Mr. Barcroft, but also Professor Krogh of Copenhagen has opposed the secretion theory. The time at my disposal prevents me from dealing with the later experimental method relied on by Professor Krogh for determining the rates of diffusion of gases into the blood. This method seems to me fallacious; but the point may be waived for the present. What is essential is that if these measurements are even very approximately correct, the aerotonometer results of Fredericq and Krogh are hopelessly inconsistent with the theory that the oxygen pressure of the mixed arterial blood represents the mean oxygen pressure of blood leaving the lung alveoli. While I admire so much of Professor Krogh's work, I think he suffered the misfortune of putting his money on the wrong horse when he definitely opposed the oxygen secretion theory of his former chief, Professor Christian Bohr.

The Mount Everest Expedition of this Year.

In the Mount Everest expedition of this year Colonel Norton and Dr. Somervell climbed without oxygen to a height of 28,100 feet, and had slept well at 27,000 feet. But for an affection of Dr. Somervell's throat and the limited time for return they could have gone higher; and Colonel Norton actually did climb some distance further, up an extremely difficult and dangerous slope. He reports that although the panting on exertion was, of course, very great, he had none of the mental symptoms of serious lack of oxygen. He considers that so far as the physiological difficulties are concerned it is quite possible to get to the top without oxygen, and he doubts whether the advantages of an oxygen apparatus such as that used are sufficient to outweigh the disadvantages.

At 28,100 feet the resting alveolar oxygen pressure would, to judge from Miss FitzGerald's graph, be only about 26 millimetres. Arterial blood such as that of the observers on Pike's Peak could, even during complete rest, only be about half-saturated with oxygen at this pressure, apart from secretion of oxygen; and the persons to whom it belonged would be black in the face. If considerable alkalosis existed the blood would be more highly saturated; but the alkalosis would, in its bad effects, counteract the good effects of the increased saturation. It seems to me that with the publication of the Mount Everest results the opposition to the oxygen secretion theory of acclimatization is in, if possible, a still more hopeless position than before.

In the Pike's Peak report the authors (Douglas, Yandell Henderson, Schneider, and myself) expressed the conclusion that though it would be hopeless for an unacclimatized person to reach the top of Mount Everest, even by aeroplane or balloon, without the use of oxygen, there was no known physiological reason why an acclimatized person should not succeed in climbing it. At this point I should like to refer to an unfortunate misunderstanding which

crept into a paper (in the *Geographical Journal*, vol. lx, p. 410, 1922) by the late Mr. Mallory. He mentioned that he had been told by the Professor of English Literature at Oxford that the physiologists had proved in a pressure-reducing chamber that it was impossible to climb to the top of Mount Everest without oxygen. There was evidently some misunderstanding about this statement. The experiments referred to were possibly those made on *unacclimatized* persons by Kellas, Kennaway, and myself. The Oxford physiologists who have concerned themselves with the subject have never regarded the ascent of Mount Everest as impossible, on physiological grounds, without oxygen, or supposed for a moment that any experiments hitherto made in steel chambers indicated such an impossibility; but it is quite evident that the less complete the acclimatization, the more benefit will be obtained from oxygen. In this connexion it would be interesting to try whether acclimatization at the highest camps could not be hastened by administering small doses of an acid salt or of ammonium chloride, so as to get rid of the alkalosis more rapidly than in the natural slow way.

The Acclimatization Phenomena as a Whole.

When we regard as a whole the phenomena of acclimatization to a low atmospheric pressure we see at once that when acclimatization is complete the organism is still in a physiologically different state from what it was before exposure to the low pressure. The breathing is greatly increased; the concentration of the blood in haemoglobin and red corpuscles is also increased, as well as the blood volume; the blood plasma is altered in composition; the blood-forming bone-marrow is increased; and if we could detect them we should probably find histological changes in the lung epithelium. All these changes, and probably many more which are not yet discovered, centre, quite evidently, round what may metaphorically be called an attempt to keep the oxygen pressure, and simultaneously the hydrogen-ion concentration, about and within the living tissues constant. But the attempt is not completely successful: a slight deficiency in both oxygen pressure and hydrogen-ion concentration remains over, and doubtless becomes more appreciable the greater the altitude. This deficiency is necessary as the stimulus for maintaining the state of adaptation. The primary stimulus is the deficiency in oxygen pressure, and the hydrogen-ion deficiency is secondary to this. If we ask why the hydrogen-ion deficiency at least should not be fully compensated, the probable answer is that this would involve such a loss of sodium, and perhaps potassium, as is resisted.

Although from its very nature the process of acclimatization cannot be theoretically complete, yet it has the unmistakable effect of keeping the oxygen pressure within the body approximately constant without more than slight disturbance of other important factors in environment. The carrying out of this involves both functional and structural changes. These changes are intelligible and predictable on the assumption that life tends to assert and maintain structure, activity, and environment in a normal and definitely co-ordinated manner. Without this assumption biology is to my mind nothing but a jumble of disconnected and unintelligible observations. It was a true physiological sense that led Ludwig and Bohr to suspect the existence of oxygen secretion by the lungs, and that led Claude Bernard to his great generalization about the active maintenance of the constancy of the internal environment. The everyday reactions of living organisms to change in environment seem to me not in any way different in kind from the reactions during acclimatization to higher altitudes, and I cannot myself see that physiology is ever likely to get anywhere worth getting to unless it makes the fundamental assumption just referred to.

This assumption differentiates it completely from mere applied physics and chemistry. Biological reality is something which our present physical and chemical conceptions fail to represent and can never come near representing until they have been profoundly modified. This modification may come in the future, but meanwhile biology must regard itself as an independent science. It is also an exact science, since it is everywhere dealing with and revealing exact regulation and co-ordination. Nothing gives us, perhaps, a clearer and more comprehensive idea of this regulation than thorough study of the phenomena of acclimatization to higher altitudes. That study must, however, be based on exact quantitative results and coherent reasoning; and if in this paper I have had to point out incoherency in the reasoning of scientific friends who in other directions have made most valuable contributions to physiology, I hope that both you and they will understand that any other course would be inconsistent with scientific honesty on my part.

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The Vicary Lecture
ON
RICHARD OWEN AS CONSERVATOR.

GIVEN IN THE THEATRE OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND, NOVEMBER 12TH, 1924,

BY

SIR ARTHUR KEITH, M.D., F.R.S.,

CONSERVATOR OF THE MUSEUM.

(*Abstract.*)

In the Vicary Lecture of last year* I gave an account of the dramatic proceedings which culminated in the confession by Sir Everard Home that he had burnt the Hunterian manuscripts. These proceedings were enacted in this College during the summer of 1824—just a century ago. The Board of Curators, six members of the Council of the College, to whom the management of the museum was delegated, then met to consider afresh the problem of describing and cataloguing John Hunter's specimens—some 17,000 in number. The Board sent for its conservator, William Clift, and told him to proceed with the preparation of catalogues forthwith.

William Clift.

Let us see how William Clift was situated. He was then 50 years of age; from Hunter's death in 1793 until the summer of 1824 he had, in reality, been servant to Sir Everard Home; all he knew he had picked up for himself; time after time he had made fruitless attempts under Sir Everard Home to carry out the task just imposed upon him. His daily duty of meeting parties at the door of the College and conducting them round the floor-space and galleries of the museum—a single great room, which had been built for the display of Hunter's treasures—was altogether a joyful task for him. But when it came to stepping into John Hunter's shoes and explaining and interpreting to all the world the harvest of the greatest medical genius of the eighteenth century—a much abler man than the faithful, modest William Clift might well have shrunk back. He set to work in his old way, pen in hand, and in his fairest script copied from such Hunterian documents as he had saved, and from other sources, such extracts as threw light on the collections under his charge. The Board met from time to time and examined these extracts, but by the end of 1826 it had become apparent to John Abernethy, surgeon to St. Bartholomew's Hospital, and at this time President of the College, the truest and most helpful friend William Clift ever had, that further skilled assistance must be given if a catalogue were to be forthcoming.

* See BRITISH MEDICAL JOURNAL, 1923, vol. ii, p. 1127. The sources from which I have drawn information for this lecture are the same as given there, with the addition in the present instance of *The Life of Richard Owen*, by the Rev. Richard Owen, 1894.

The required assistance, as we must suppose Abernethy knew, was close at hand. In the autumn of 1826, when catalogue production was becoming urgent, Mr. Richard Owen, having become a member of the College at the age of 22, put up his plate in Cook's Court, Carey Street (within a stone's throw of the museum), to practise his profession—mostly among young lawyers. Little more than two years had elapsed since he had finished his apprenticeship to a surgeon in Lancaster, in which town he was born and bred. One year he had spent in Edinburgh winning the golden opinion of that most enlightened anatomist Dr. John Barclay. The second year he spent at St. Bartholomew's. Abernethy at once took him on as a prosector, and found that Barclay's strong letter of recommendation in nowise exaggerated Owen's ability. From Barclay young Owen had learned to appreciate Hunter as well as the more modern anatomical schools of France represented by Cuvier and Cuvier's rivals—the philosophic anatomists. In Edinburgh Owen had taken the initiative in founding a Hunterian Society. As a student at St. Bartholomew's he wrote two papers on surgical subjects—one on a case of aneurysm of the gluteal artery, the other on a case of encysted calculus of the bladder. Taking all these circumstances into account one cannot help thinking that Abernethy had something to do with the selection of the site at which Owen sought to establish himself in practice during the autumn of 1826.

Clift and Owen.

When the Board of Curators met in February, 1827, Richard Owen was asked to attend. He was engaged to assist Mr. Clift, his emoluments being £30 a quarter, with permission to attend to his practice in the intervals of his duties. Thus William Clift and Richard Owen were brought together, one of the strangest partnerships to be found anywhere in the annals of medicine or science. They were contrasted types. Clift was a small man, only a little over 5 ft.; Owen stood 6 ft. in his stocking soles. Years later Carlyle described him as "the tall man with the great glittering eyes," for his eyes were great and full, and Clift's were small and sunken. Clift was born of humble people; he was happier as servant than as master. Owen came of a good family; his father was a West Indian merchant who fell on evil times. Owen was born to command; he claimed equality with the best. Clift was the meticulous gatherer of small facts; Owen, we shall see, dealt with big things; he could imagine, create, and discover; he was a statesman; he could conceive and execute. But Clift and Owen had this in common—partisanship: they raised common enmities with ease and maintained them with vigour. Thus it came about that Richard Owen was engaged to assist William Clift to prepare catalogues, but in the course of events, as one could have foreseen, it soon came about that the roles were reversed, and later still Owen dispensed with the conservator's assistance altogether.

Leaving these two men to pursue their vocations in the museum throughout the year of Owen's appointment (1827), we turn aside to note certain events which happened outside their daily routine and which had a very important bearing on the history of the museum. The conservator's house looked out on the trees of Lincoln's Inn Fields; its back staircase served the gallery of the museum as well as the conservator's bedrooms. In September, 1827, the inmates of this house were the conservator, his wife, and their two children—William Home Clift, a young man of 26, and Caroline Amelia Clift, aged 25. Young Home Clift was to be his father's successor. His father had trained him in museum ways, and at present he was struggling very ineffectively at the compilation of catalogues. He was light, gay, and fond of company, a source of anxiety to his father. It was otherwise with Caroline; she had inherited her father's slight build of body and could pull his heart-strings as she would. Years afterwards Caroline Fox described her as "a very perfect little fact in the great history of the world."

Caroline Clift.

It so happened on a September day in this year that little Caroline mounted some steps to put a bell-pull to rights, overbalanced, and fell. Her brother fetched Richard Owen from the museum to render first aid. The tall young surgeon with "the great glittering eyes" speedily proceeded to fall in love with his patient—"the perfect little fact." It was a brief wooing; by Christmas-time he had presented her with a carved tortoise-shell comb, a volume of Cowper's poems, and an engagement ring. He was 23 and she was 25. She knew well that she had linked her fortunes with those of a man destined to greatness. This apparently insignificant affair of the bell-pull, we can now see, turned out to be a critical event in the history of the museum; it not only gave Richard Owen a perfect wife, but it secured for the Hunterian Collection the services of the one man then in England who had the ability and energy to grapple with its problems.

Two years later, although still in practice, Owen was regarded as a permanent member of the museum staff and paid at the rate of £150 a year. But even in 1829 such an income was altogether insufficient to set up house on. Hence early in 1830 we find Owen in Birmingham in search of a house-surgeoncy. From there he wrote a letter to Caroline which permits us to see what kind of man and lover he was. "You know not," he writes, "how rapidly I have succeeded in gaining golden opinions from all sorts of men in this place. *You* have lent me your attractions and have prompted me in all my interviews." He saw no prospect of an early marriage by settling in Birmingham; his heart, he wrote, longed for the "happy Fields." The true lover at the end of this letter exclaims, "The die is cast; you shall be with me ever and guide and prompt and see my exertions." He returned from Birmingham in this mood, and within twelve months the College was in possession of its first batch of catalogues—for which it had waited wellnigh thirty years.

We find entries in William Clift's private notebook which show us that Owen did not return to his rooms in Cook's Court but became an inmate of the conservator's household. He paid £15 a quarter for board and lodgings and young Clift paid the same. But there was this difference: Owen settled his account promptly on pay day, whereas the scapegrace Clift was always behindhand and had usually to borrow part of his belated payment to meet present needs; Richard, however, borrowed only when setting out to see his mother in Lancaster—which he did every year, and often had to ask for an advance to bring him back to work. In September, 1832, these entries in William Clift's private notebook suddenly cease. When we turn to his diary we find the explanation. "On the evening of this day (September 11th, 1832) a most unfortunate and fatal accident occurred to my dear son; in alighting from a cabriolet near the lower end of Chancery Lane at about 10 o'clock p.m." . . . September 17th: "This morning about half-past-three my poor son breathed his last." The cab accident comes into the history of our museum, for it left the ultimate succession to the conservatorship open to Richard Owen.

The amount of work which Owen got through after his return from Birmingham, the researches he carried out, and the discoveries he made, leave one in wonderment; with the death of William Home Clift in 1832 they became almost incredible. But his Herculean efforts did not impress the Board of Curators—for a reason I shall explain presently. In 1833 Owen protested; he complained to the Board that he was worse paid than the meanest country apothecary and that he had to carry on his work in a draughty thoroughfare. The Board raised his salary to £200 a year and gave him a more comfortable workplace. In 1834 the museum had to be rebuilt and extended. All the responsibilities of the change fell on Owen. In the following year, 1835, when the building alterations were completed, quarters were provided for Owen, now the assistant conservator, behind the museum, with a door opening on Portugal Street, on which "Mr. Owen" had his name inscribed, for he still regarded himself as a surgeon waiting for practice. In this year, 1835, his salary was raised to £300 a year, which apparently justified him in embarking on marriage. Early in the morning of his thirty-first birthday, July 20th, he and Caroline Clift drove to St. Pancras Church, where they brought an eight years' engagement to an end by a happy marriage and a brief honeymoon. And then back to catalogues! Here, however, I must note a little but significant entry in William Clift's cashbook. He drew from the bank

500 golden sovereigns at this time; 30 he put in one bag for the bride, 30 in another for the bridegroom, and 440 went to their bank account. John Hunter's apprentice was proud of his son-in-law, and well he might be.

Cataloguing the Museum.

I must now turn back and briefly trace the course of events in the museum from the time Owen was engaged as assistant to the conservator until his marriage. From the minute-books of the Board of Curators we find an ever-recurring call for catalogues. The conservator always responds "coming," but never comes. When Owen returned from Birmingham matters rapidly changed—catalogues were prepared in rapid succession. In the spring of 1831 six volumes had been written, printed, and published; six sections of John Hunter's collection had at last been supplied with catalogues—namely: (1) Morbid specimens in spirits; (2) Morbid specimens in a dried state; (3) Human and comparative osteology; (4) Natural history preparations; (5) Monsters; (6) Vascular and miscellaneous preparations. The two largest and most important sections still remained untouched—namely, the physiological series, about four thousand preparations, by which Hunter had sought to illustrate the manner in which the functions of the animal body are carried on in all forms of living things—movement, circulation, respiration, digestion, reproduction, development, and growth. Even more difficult to handle was his collection of fossils—enigmas to the men of Hunter's time, but not to him.

The Board ordered Owen to prepare a catalogue of the physiological series. It was estimated that it would occupy him for three years. Part I, which covered the preparations illustrating the modes in which locomotion and digestion were carried out in the animal kingdom, occupied two years. While cataloguing this single section of the physiological series Owen found it necessary to dissect two hundred animals in order to identify Hunter's preparations and to complete the founder's formulated design. He became the most active Fellow of the recently founded Zoological Society; somehow he scraped the money together to become a life member. He claimed and obtained the first call on all the animals which died in the gardens of the Zoological Society. He gave such vivid and full accounts of his dissections as had never before appeared in England. A single example, chosen from scores at our disposal, will serve to illustrate the quality of his genius. A member of the College, Mr. George Bennett, brought home from the Pacific in 1831, and presented to the museum, a specimen of the pearly nautilus—a "living fossil," almost the first to reach Europe. In 1832 the Board entrusted it to Owen and requested him to dissect it and prepare a description for publication. He spent five months on it, and, although imperfectly preserved, he unravelled its exact structure, and fathomed its relations to all other living cephalopods as well as the relations of these to one another; he applied to it Hunter's methods, and noted how its bodily functions had been carried out during life. He was his own dissector and his own draughtsman—a finished workman in both capacities. The monograph was published by the Council at a cost of £365. It drew unstinted praise from every source except that from which Owen had expected most—his own Board. Clift thought "Owen was much to be pitied"; Sir Anthony Carlisle, a member of the Council of the College, bluntly said that "his pearls had been cast before swine"!

Conflicts with the Board.

On reading the minutes of the Board of Curators at this time one is made conscious of a feeling of antagonism between the members of the Board and its servants Clift and Owen—an antagonism which flared up into open strife in 1841 and reached a climax in 1842. In the spring of 1841 Owen finished the fifth and last volume of the catalogue of Hunter's physiologcal series. The preparation of this catalogue occupied him ten years, during which time he passed from being an obscure member of his College to being acclaimed "the first anatomist of the age." Honours were being showered on him by learned societies at home and abroad. The ladder by which he reached greatness was made by Hunter, but it was just because Owen understood Hunter's aim and design and knew how to make the steps secure that success came to him. As he proceeded from volume to volume of this catalogue he encountered innumerable problems which required laborious research and uncommon insight for their solution. In the ten years spent on it he contributed to learned societies 157 papers—all of them abiding additions to knowledge, many of them opening up great uncharted territories of animal life. Besides these he wrote ten volumes in the form of catalogues or treatises. Every year, from 1837 onwards, he gave in the theatre of the College twenty-four Hunterian lectures, in which he expounded fresh observations and generalizations gleaned in the course of his work in the museum and in the Zoological Gardens. One marvels at what he accomplished; and how he managed to get so much out of his body, his brain, and his purse. For the scientific societies to which he belonged were expensive; he was fond of society, of the theatre, of music, of dining out, and of famous men. Yet his income was his salary of £300 with £50 additional for lectures, for soon after his marriage he abandoned all thought of gaining money from practice. Caroline Owen must have managed well.

In 1839 the Board of Curators was reconstituted and became the Museum Committee. Three members of this committee require our attention—Mr. Robert Keate, surgeon to St. George's, Mr. George James Guthrie, surgeon to Westminster Hospital, and Mr. John P. Vincent, surgeon to St. Bartholomew's. Their patience with Mr. Owen was wellnigh exhausted by 1840. The committee informed him that it was dissatisfied with the way he was spending his time, particularly as regards the study of fossils. Owen defended the collection and study of fossils and declared he worked solely for the credit of the College. Mr. Darwin had presented to the College the remarkable fossils he had gathered in South America while on board the *Beagle*, and Owen had described them. "When," asked Mr. Guthrie, "had Mr. Owen obtained permission to do such a thing?" Mr. Keate, who was then president, told him "he must give his full time to the museum or resign." The committee threatened to stop lectures and all forms of research until catalogues were completed. The painting of a picture of a chimpanzee, which Owen was having made for the museum, was left on his hands because it had not been sanctioned. The attendants in the museum were ordered to report directly to the committee every week, not through their officers. Mr. Guthrie went into the museum and altered the arrangement of the specimens.

The climax came on January 25th, 1842. A special meeting of the Museum Committee, with certain additional representatives from the Council of the College, was summoned to consider Owen's position. Clift and Owen waited by the door; Owen was called in. The president of the College, Mr. Guthrie, informed him that there was grave dissatisfaction in the Council concerning the manner in which he performed his duties. Owen expressed his regret if he had given cause for offence and was conciliatory. He was then asked if he would take over the duties of conservator with the proviso that he would publish nothing without having first obtained the permission of the Council. Owen expressed his willingness to take over the duties of conservator with one exception—namely, the daily task of conducting parties round the museum. This difficulty was overcome; William Clift, who was to become senior conservator, wished to retain the conduct of parties. Poor William Clift was merely a spectator in these proceedings! He was given £400 a year for life. He vacated the conservator's official residence and his son-in-law moved into it. And here we must leave Owen as he enters the second period of his conservatorship; it was to last fourteen years—until 1856, when he became superintendent of the Natural History Department of the British Museum. Suffice it to say that it was even busier, more brilliant, and more turbulent than his first period.

A Clash of Ideals.

What was the cause of these conflicts between Owen and his committee? He was proud, imperious, overbearing, and, it must be owned, selfish and jealous, especially towards his rivals and juniors. His committee may be accused of short-sightedness. Although these opposing qualities may have

contributed to the quarrel, yet the real cause of the conflict lies elsewhere. The truth is that Owen had yoked John Hunter's chariot to Cuvier's steeds, and his committee, if it did not know exactly what had happened, did see that the chariot was moving in a wrong direction as far as surgery and medicine were concerned. Hunter pursued his studies and built up his museum to throw light on man—on the nature of his disorders and diseases, and on the manner in which the functions and actions of his body are accomplished. He knew well that the collections he had assembled might be employed for two other purposes. His dissections might be used, not for the study of function, but for the classification of all living things into natural groups and orders. He knew that his great collections of fossils opened vistas into past ages of the world. John Hunter turned his back on such aims, but two years after his death Cuvier set to work. He built up anatomical collections just for the two purposes which Hunter refused to entertain, and by his genius and industry enthralled the world by his discoveries during the first three decades of the nineteenth century. At first Owen's sympathies were with Hunter's original aims, but they soon became dissipated under the brilliance of Cuvier's sun. When Cuvier visited our museum in 1830, two years before his death, he fired young Owen with his aims and zeal. We must remember that in Owen's time the Natural History Departments of the British Museum were in abeyance, and Owen set out to make our museum supply a national deficiency. He intended to make it the home for the classification of all forms of animal life—for the separation of the animal kingdom into natural groups according to structure. More particularly he intended that the museum should become the headquarters for the interpretation of past worlds of life. If we are to understand the continual friction recorded in our minutes throughout Owen's time, we have to keep in mind the clash of ideals—the ideal the Museum Committee had in view, and the ideal which Owen nursed as if it were his religion. The committee was for ever trying to get Owen to go its way, and he was for ever breaking off to follow his own path. It was in Cuvier's world that Owen lived, not John Hunter's. If we are to study structure and function as a service to medicine we must go "back to Hunter."

British Medical Association.

PROCEEDINGS OF SECTIONS AT THE ANNUAL MEETING, BRADFORD, 1924.

SECTION OF PATHOLOGY AND BACTERIOLOGY.

Professor C. H. BROWNING, M.D., President.

XANTHOMA AND XANTHOSIS.

BY

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THE importance of the part played by cholesterin and its esters in pathological processes is receiving increasing recognition, an outcome of the large amount of work—anatomical, chemical, and experimental—which has been done on this subject in the last twenty years. The purpose of the present communication is to integrate a number of different pathological states in which the deposition of cholesterin fat is the salient anatomical feature, and to show at the same time how frequent is the occurrence of minor grades of this condition in relation to a large series of pathological processes.

When cholesterin fat is deposited in a cell in crystalline form it causes the cytoplasm to assume a "foamy" appearance in paraffin sections, while a sufficient aggregation of such cells gives rise to an area opaquely yellow to the naked eye. The gross and microscopic appearances are exemplified normally by the outer two-thirds of the adrenal cortex, and in the female by the corpus luteum, especially the corpus luteum of pregnancy in its later stages. Pathologically, foamy cells are, in the main, phagocytic cells of endothelial origin, but there is evidence to show that fibroblasts may become similarly affected, and in the central nervous system a corresponding part is played by the neuroglia.

In a previous communication[1] I have classified local cholesterin-fat deposits into those which are due solely or principally to local tissue changes, and those which are the focal expression of a condition of hypercholesterinaemia. The latter group is much the smaller, its principal constituents being the various forms of cutaneous xanthoma, the "strawberry gall bladder," cholesteatomata of the choroid plexus, and probably certain cases of arterial atheroma. The former group includes a large number of local necrotic and chronic inflammatory lesions of various kinds, and, especially, conditions in which there is retention in the tissues of lipoid-rich secretions, extravasations, and exudations. A third group might be added: lesions in which the deposit of cholesterin fat is merely the continuation of a normal function of the cells of the part—for example, adenoma of the adrenal cortex.

The extracellular deposition of crystals of pure, or nearly pure, cholesterin in many of these lesions, and the frequent occurrence of foreign-body giant cells in relation thereto, is described in detail in the paper referred to above. Suffice it to say here that the condition is usually associated with some form of cellular death, and especially with lesions in which large aggregations of foamy cells are themselves becoming, or have already become, disintegrated. Thus we find that whereas small early cholesteatomata of the choroid plexus are composed simply of closely packed aggregations of foamy cells in the meshes of a delicate connective-tissue stroma, the corresponding tumours of larger size are mere encapsuled collections of cholesterin plates, with or without related foreign-body giant cells.

A short account may now be given of some of the more important examples of cholesterin-fat deposit.

A. HYPERCHOLESTERINAEMIC XANTHOSIS.

1. *Xanthoma.*

This is a cutaneous disorder in which one or more bright yellow plaques or nodules make their appearance on various parts of the body. Several clinical varieties are recognized, according to the site, character, and etiology of the lesion. When it is confined to the eyelids—and this is much the most common form—it is termed "xanthoma palpebrarum"; when it is more widely disseminated "xanthoma multiplex." Sometimes the lesions are flat (xanthoma planum), sometimes nodular (xanthoma tuberosum). In a small proportion of cases, usually of multiplex type, there is an underlying diabetes—hence xanthoma diabeticorum. The essential lesion is the same in all—the accumulation in the subepithelial layers of the skin of numerous phagocytic cells laden with esters of cholesterin. These cells are present in great profusion as a rule, and to begin with are most abundant around the smaller blood vessels. In lesions of longer standing, especially those of tuberose type, there is also much proliferation of fibrous tissue, which leads ultimately to a relative reduction in the number of foamy cells, as well as to diminished vascularity.

The presence of giant cells in cutaneous xanthoma has often been noted. For the most part these are giant foamy cells, in which the nuclei, numbering from two to twelve or so, are situated centrally, and the peripheral cytoplasm is exactly similar to that of the uninucleated forms. Occasionally giant cells of the ordinary foreign body type with deeply eosin-staining non-foamy cytoplasm, and larger and more widely scattered nuclei, are seen. They are most frequent in xanthomas of larger size and longer standing, and are often related, as above described, to extracellular crystals of pure or nearly pure cholesterin which have been formed by disintegration of the foamy cells. There is evidence to show that such cells pass through a "foamy giant-cell" stage.

Cutaneous xanthoma, especially the multiple tuberose type, is sometimes accompanied by similar lesions affecting

tendons and tendon sheaths and the capsules of joints. These lesions should be clearly distinguished from the myeloid tumour of tendon sheaths, to which they bear superficially a close resemblance. The latter is a strictly local affection, always single, and occurring chiefly on the fingers and hands; true xanthomatous tumours are frequently multiple, are often associated with cutaneous lesions, and occur most commonly in the tendo Achillis and the tendo patellae. The case recently reported by Ollerenshaw (1923)[2] is apparently of this kind. Microscopically the myeloid tumour of tendon sheaths is a fibro-endothelioma, with numerous osteoclast-like giant cells uniformly distributed throughout it, and either with or without local patches of xanthosis. The other is essentially xanthomatous, with occasional foamy giant cells, or foreign-body giant cells related to cholesterin plates.

The association of cutaneous xanthoma with an increased cholesterin content of the blood was first reported by Chauffard and Laroche (1910),[3] who found it in two of the four cases which they examined. Many records by various observers are now available, and have recently been reviewed by Harrison and Whitfield (1923).[4] In the great majority some degree of hypercholesterinaemia was present at the time of examination, and there are good grounds for supposing that even in those which gave a low figure a state of hypercholesterinaemia had existed at the time of onset of the cutaneous lesion. Cases are on record, for example, where xanthomas have continued to exist long after the hypercholesterinaemia which produced them had disappeared. This is due to the chronic inflammatory thickening and fibrosis which have taken place, resulting in greatly reduced vascularity, and consequent interference with the reabsorption of the lipoid. In xanthoma diabeticorum, on the other hand, the skin lesions, especially if small, sometimes disappear quite rapidly. This is due to two factors, as Major (1924)[5] has emphasized: a disappearance of lipaemia and hypercholesterinaemia on the one hand, and the presence of a good blood supply to the skin lesions on the other.

The normal cholesterin content of the blood plasma is given by Chauffard, Laroche, and Grigaut (1911)[6] as varying from 0.11 to 0.18 per cent. In a series of twelve normal individuals investigated by Dr. Cecilia Shiskin (1922)[7] in my laboratory (by a modification of Myers and Wardell's colorimetric method) the figures for blood plasma ranged from 0.13 to 0.19 per cent. In xanthoma the highest readings are given by diabetic cases, and higher figures are obtained in xanthoma multiplex than in xanthoma palpebrarum. In a series of six cases of xanthoma palpebrarum which we have examined* the figures ranged from 0.124 to 0.4 per cent., and in four they were distinctly above the normal maximum. In a case of xanthoma diabeticorum now under observation two analyses at an interval of ten days gave the extraordinarily high figures of 3.8 and 4.2 per cent. In two similar cases reported by Heffmann (1918)[8] the blood cholesterin was 2.5 per cent., and in Fahr's (1920)[9] case it was 1.4 per cent. In published cases of xanthoma multiplex and xanthoma tuberosum other than diabetic, figures ranging from 0.4 to 0.7 per cent. are not uncommon.

It is generally supposed, then, that cutaneous xanthoma is the result of a focal outpouring of cholesterin fat from the overcharged blood into the superficial layers of the corium, where it is speedily taken up by mononuclear (endothelial) phagocytes. Local trauma is of some importance in determining the onset of the lesion, as is well seen in a case recently reported by Major (1924)[5]. A diabetic of 16 (blood sugar 0.322 per cent., cholesterin 0.4 per cent.) was bitten at two places on the forearm by a mosquito. Two small inflammatory nodules were produced, and a few days later a deposit of yellowish-orange pigment appeared. The nodules became quite hard, and presented the typical appearance of the lesions of xanthoma diabeticorum. They cleared up promptly under insulin treatment.

The disturbances of cholesterin metabolism which lead to the formation of xanthoma are beyond the scope of the present paper, but reference may be made to the recent review of the subject by Harrison and Whitfield (1923).[4]

It is obvious from what has been said that xanthoma is quite definitely a non-neoplastic disease, and the term is therefore strictly a misnomer. The condition is one of cellular reaction to the presence of a definite chemical substance, and when this stimulus is removed the tendency is for the lesions to regress; certainly they cease to grow. Nor is there histological evidence of actual proliferation of xanthoma cells once formed. Indeed, there are good grounds for believing that this is an effete cell which has gone beyond the possibility of recovery of the powers of proliferation. Xanthoma, on the other hand, is a quite convenient term, belonging as it does to the same category as tuberculoma, haematoma, and syphiloma, and one hesitates to suggest its replacement by "cutaneous xanthosis."

2. *The Strawberry Gall Bladder.*

This peculiar and characteristic lesion was first described by Moynihan in 1909[10] as "a condition of the gall bladder in which fine grains of calculous material are embedded in the mucosa"—a description by no means wide of the mark although based on naked-eye examination only. The cholesterin-fatty nature of the deposit was confirmed microscopically by the writer in 1915 (unpublished observation), and since then a large number of specimens of this kind have been examined histologically. The term "strawberry gall bladder" was first used by MacCarty in 1910,[11] and is an excellent descriptive name for a definite pathological entity. In the first instance this author wrongly attributed the appearance to erosion of the apices of the villi, with replacement of the epithelium by scar tissue. In a subsequent paper on papilloma of the gall bladder (1915)[12] he refers to fat-containing cells in the stroma, and later still (1919)[13] speaks of the strawberry gall bladder as due to the presence of a lipoid substance within the swollen connective tissue cells which lie just beneath the epithelium. A very full description of the lesion has been given by Boyd (1923).[14]

The cholesterin-fat deposit of the strawberry gall bladder is present in greatest abundance superficially—that is, in the tips of the mucosal folds. It is mainly contained in groups of foamy cells indistinguishable from those of cutaneous xanthoma, and the peculiar "strawberry" appearance seen by the naked eye is due to its irregular distribution in streaks and patches. A closely related condition which may accompany the other or may occur independently is that of lipoid polyposis. Here the large amount of deposited cholesterin has led to the formation of polypi, bright yellow bodies of irregular shape, which usually measure from 1 to 3 mm. in diameter, and which are often attached to the mucosa by an extremely slender pedicle. In several instances I have seen these polypi broken off and lying free in the lumen of the gall bladder. Microscopically they consist of solid masses of foamy cells enclosed in the meshes of a thin and delicate fibrous stroma, with or without a covering layer of epithelium. Obviously, lipoid polyposis is merely a further development of the strawberry gall bladder, but inasmuch as polypi may be present without any general lipoid stippling, I would suggest that they are more permanent formations which remain behind when the general lipoid deposit is absorbed. The lack of vascularity and slenderness of the pedicle would account for this. An important practical point is the possible relationship of these conditions, and especially of lipoid polyposis, to gall-stone formation. The strawberry gall bladder may or may not be accompanied by gall stones, and when it is, the latter may be of two types—either the solitary cholesterin stone, or multiple mulberry calculi, also mainly composed of cholesterin. The mulberry stones are usually few in number, and those of smaller size bear a remarkably close resemblance to the lipoid-containing polypi above described. It seems highly probable that there is here a direct etiological relationship, as Chauffard (1922)[15] suggests, and the experimental work of Dewey (1916)[16] may be regarded as affording support for such a view.

I am not aware that there are any records of the cholesterin content of the blood in these cases, but from

* I am indebted to Dr. Dorothy Priestly and Dr. Cecilia Shiskin for the chemical analyses.

post-mortem room experience and other collateral evidence I think there can be little doubt that the strawberry gall bladder is only another local manifestation of the hypercholesterinaemic state. Whether the cholesterin fat is excreted directly from the blood into the gall bladder mucosa as in cutaneous xanthoma, or whether, as Aschoff and Bacmeister (1909)[17] suggest, it is reabsorbed from an overcharged bile, is still undetermined, although the latter seems, *a priori*, much the more likely event. The amount of cholesterin fat in the mucosa of the strawberry gall bladder may be very large; in six examples investigated by Boyd it varied from 34 to 60 per cent. of the dry weight, as compared with 0.5 and 1.5 per cent. in normal controls.

3. *Cholesteatoma of the Choroid Plexus.*

This is another form of local xanthosis which is probably the direct result of hypercholesterinaemia. The lesion consists of a number of yellow nodules of various sizes, usually small, irregularly scattered throughout the choroid plexuses, especially of the lateral ventricles. Microscopically they consist merely of a close aggregation of foamy cells within the interstices of a delicate fibrous stroma. In cholesteatomas of larger size and longer standing, such as occur rarely in man though commonly in the horse (Roussy, 1912),[18] the occurrence of necrotic changes with cell disintegration leads to extracellular deposition in great abundance of crystals of pure cholesterin. These in turn stimulate the production of foreign-body giant cells, so that the histological picture comes to be entirely different from that seen in the first instance. In the cases of cholesteatoma of the choroid plexus which I have examined the lesions have almost invariably been symmetrical, and this, together with the state of the suprarenals, leads me to the view that here again we are dealing with the local expression of a hypercholesterinaemic state.†

4. *Arterial Atheroma.*

The yellow colour of the early flat patches of arterial atheroma is largely due to the presence of cholesterin fat in the intima. Often it can be seen to be contained within foamy cells, but as the patch becomes thickened, necrosis and disintegration take place, the lipoid becomes largely de-esterized, and crystals of pure cholesterin are deposited. In man the relationship between hypercholesterinaemia and atheroma is uncertain. Experimentally Anitschkow (1913)[19] and others have produced a condition of atheroma in rabbits by overfeeding with cholesterin or cholesterin-rich foods, and the collateral lesions met with in some human cases of atheroma point to the presence of a hypercholesterinaemic factor.

B. Xanthosis from Local Tissue Changes.

1. *The Myelin Kidney.*

In a certain proportion of cases of subacute glomerulo-tubular nephritis deposits of cholesterin fat make their appearance in the cortex, especially that part which borders on the medullary pyramids. In the earlier stages the lipoid is contained within the epithelial cells of the convoluted tubules, but later, presumably when these cells disintegrate, it is taken up by phagocytic cells in the stroma. The naked-eye appearance is highly characteristic; at the line of junction of cortex and medulla there is a broad, irregular, streaky zone of yellow colour and opaque aspect, often extending well out into the cortex. Microscopically there are groups of foamy cells irregularly scattered throughout the stroma of the cortex, especially its inner half, with, of course, the characteristic changes of subacute nephritis as well. It has been suggested (McNee, 1922)[20] that this unusual lipoid change is due to the damage to the tubular epithelium being of more severe degree than is usual in glomerulo-tubular nephritis. Ordinarily it is neutral (glyceryl) fat which is deposited in these cases, but when the cells are damaged beyond repair lipoid degeneration takes place.

† Cholesteatomata in other situations—middle ear, breast, brain, etc.—are, of course, entirely different from those of the choroid plexuses. These are the typical "onion tumours" of squamous epithelial origin, and almost their only point of similarity to the other is that here also cholesterin plates become deposited in large numbers, a direct derivative of the keratinized epithelial cells.

2. *The Myeloid Tumour of Tendon Sheaths.*

This is a slowly growing simple tumour, most frequently met with on the fingers and hands. Microscopically it has the characters of an endothelioma (Stewart and Flint, 1917),[21] but it also contains numerous giant cells of osteoclast type. Large quantities of haemosiderin are liable to become deposited, giving a rich brown colour to the affected areas, and very often patches of local lipoid deposit also make their appearance. The latter are of a bright yellow colour to the naked eye, and are composed microscopically of aggregations of foamy cells.

It has been suggested by Fleissig (1913)[22] that this is a granulomatous lesion and not a tumour; by others, that it is xanthomatous in nature. My own view is that it is a true tumour, an endothelioma, and that the deposition of cholesterin fat in certain parts is a purely local phenomenon, dependent on local tissue disintegration. The xanthoma nodules occasionally met with in tendons and tendon sheaths should be clearly differentiated (*vide antea*).

3. *Subacute Inflammation of Adipose Tissue.*

When adipose tissue is involved in a subacute inflammatory process it is not uncommon for aggregations of large foamy endothelial cells to make their appearance in the interstices of the tissue, between the oil droplets. Like foamy cells elsewhere, they are filled with cholesterin fat, and often they may be seen going on to the formation of foamy giant cells. Rarely, pure cholesterin crystallizes out, and a remarkable histological picture results, in which foamy cells, giant cells, cholesterin clefts, and foci of necrosis are mixed up together. Similar changes may be met with in the quieter forms of fat necrosis.

4. *Subacute and Chronic Salpingitis.*

Even in the early stages of subacute salpingitis, while the epithelium is still intact, foamy cells may be present in the mucosa in large numbers. Later, when the pus tube has become lined by granulation tissue and the epithelium has completely disappeared, they may be present in the greatest profusion in the inner layers of the wall, which assumes in consequence a bright yellow colour. The appearances clearly indicate that this lipoid is absorbed from the inspissating pus retained within the tube by closure of the ostia. Later pure cholesterin crystallizes out *in situ*, with formation of numerous clefts and giant cells.

5. *Subacute and Chronic Abscesses.*

These occur in many situations, notably in the liver and kidney, and may show a similar thick yellow wall with innumerable foamy cells in microscopic sections. I have seen this in portal pyaemia following appendix abscess of low virulence, in chronic pyonephrosis, in suppurating polycystic kidney, in suppurating gummata, and many other conditions. Often the contained pus is sterile and inspissated, and may itself be the seat of crystallization out of cholesterin.

6. *"Retention" Lesions of the Breast.*

These have been described in some detail in two previous papers (Stewart, 1914,[1] and Stewart and Forsyth, 1920[23]). Briefly, it may be stated that in certain breast lesions associated with duct obstruction and the retention of secretory and other products a great local concentration of cholesterin fat takes place, with the usual cellular response. In the earlier lesions, even while the dilated ducts are still lined by epithelium, the lumen comes to be occupied, it may be completely, by large numbers of typical foamy cells. The appearance presented sometimes suggests that the duct epithelium itself is undergoing foamy change, but, if so, the end-result is a cell indistinguishable from the ordinary foamy cell of mesoblastic origin. In more advanced lesions the epithelial lining of the dilated ducts becomes replaced by granulation tissue in which foamy cells are present in large numbers. Giant cells also make their appearance, either in relation to deposited rhombic plates, or in the form of rosettes around bunches of the acicular form of cholesterin. The lesions in which these changes chiefly occur are subacute mastitis and tuberculosis. Not

infrequently the patients are multiparae in whom maldevelopment or recession of the nipple has led to non-use of the affected breast.

7. *Cerebral Softening, etc.*

The lipoid-containing phagocyte or compound granular corpuscle is a prominent feature of all lesions of the central nervous system in which disintegration of myelin is taking place. They are seen in greatest profusion at a certain stage of cerebral softening, and account for the bright yellow colour of the wall which, in the course of a few weeks, comes to surround the focus of liquefaction. From the local lesion they pass to the perivascular lymph spaces, especially those of the veins. While it is probably true that most of these cells are of endothelial origin, like foamy cells elsewhere, there is evidence that some at least are derived from neuroglia, others possibly from fibroblasts (Buzzard and Greenfield, 1921[24]).

8. *Dermoid Cysts.*

When dermoid cysts lose their epithelial lining, whether from increase in size or from inflammatory or degenerative changes, the exposed connective tissue wall tends to become covered by a layer of granulation tissue in which foamy cells and giant cells are a prominent feature. The former owe their presence to absorption of cholesterin fat from the sebaceous and other epidermic contents of the cyst, the latter to unabsorbable keratinous debris, plate cholesterin, hairs, and the like (Stewart, 1913[25]). Rarely, foamy cells are present in such profusion that yellow nodules are formed whose structure is almost indistinguishable from that of cutaneous xanthoma.

9. *Mycosis Fungoides.*

In the only example of this disease in which I have had the opportunity of making a *post-mortem* examination, a remarkable change was observed to occur in connexion with the cutaneous tumours of the final stage. The well known phenomenon of disappearance of tumours was a prominent feature in this case. Large sarcoma-like skin nodules as big as a hen's egg would disappear, without ulceration, in the course of a few weeks, leaving behind areas of mixed yellowish and brownish pigmentation. Microscopically the latter was found to be due to the presence of patches of haemosiderin in the subepithelial layers of the skin, the former to a broad zone of foamy-cell accumulation in the cutis vera. Here and there narrow strands of closely aggregated small round cells could be seen, relics of the original tumour. It would appear that rapid cellular disintegration had taken place, with absorption of most of the degradation products, but retention *in situ* of the lipoid and haemosiderin.

10. *Lesions of the Thyroid.*

In many necrotic, neoplastic, and subacute inflammatory lesions of the thyroid foamy cells appear in large numbers, both within the glandular acini and in the stroma. Frequently the process goes on to the deposition of plate cholesterin, with or without foreign body giant-cell reaction. The process is a strictly local one, the result of tissue disintegration.

11. *Tumours.*

The occurrence of cholesterin and other crystals in tumours has been carefully studied by Powell White, 1909,[26] to whose paper reference should be made. With the exception of the myeloid tumour of tendon sheaths above referred to, however, it is unusual for a xanthic reaction of the ordinary type to occur. Either the crystals are contained within the tumour cells, or they are embedded in necrotic debris so that no cytological response is possible.

Summary.

A number of lesions of various kinds are grouped together on account of the common characteristic of cholesterin fat deposition. In the first group are placed those in which the phenomenon is regarded as the local expression of a condition of hypercholesterinaemia—namely, cutaneous xanthoma, strawberry gall bladder, cholesteatoma of the choroid plexus, and arterial atheroma. The second group includes a long list of local lesions, necrotic, inflammatory, and neoplastic, in which the xanthosis is the result of absorption from disintegrating tissues or exudates.

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IMPROVED METHODS OF OBTAINING CULTURES FROM THE COLON: A "SIGMOID LEECH."

BY

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The customary bacteriological methods of examining the faeces in cases of inflammatory diseases of the intestine need some improvement. Most of the pathogenic intestinal bacilli for which the bacteriologist searches, such as the typhoid, paratyphoid, and dysentery bacilli, are non-fermenters of lactose, yet to detect them the faeces are plated out on nutrient media containing lactose, a carbohydrate of no value to the bacteria sought, but a readily available source of energy to the unwanted lactose fermenters. Consequently such methods yield a plentiful growth of non-pathogenic lactose fermenters such as *B. coli*, whilst the pathogenic non-lactose fermenters are notoriously difficult to cultivate. An ideal medium would be one which favoured the growth of pathogens and inhibited the harmless; this remains to be discovered. In the meantime it is better to employ a medium which at any rate gives an equal chance to all.

Another reason why the customary methods are open to criticism is because the sampling accepts the host of microbes in the faeces without discrimination, so that the task remains to separate significant bacteria from the multitude of insignificant. When disease of the intestines exists it is plain that the investigator is more likely to discover the disease-producing germs if he obtains his specimen from the lesion than at a considerable distance. In a case of diphtheria of the throat better chances of discovering diphtheria bacilli are offered when the throat is swabbed than would be by an examination of the sputum; similarly, in a case of dysentery more success attends the scraping of an intestinal ulcer than the examination of a mass of faeces. The vast majority of the microbes to be found in the faeces of a patient suffering from an intestinal infection have nothing to do with the disease. We should aim at reaching nearer the infected area and avoiding this massive admixture with saprophytic germs.

In looking for better methods for cultivating the pathogenic bacteria of such intestinal diseases as chronic ulcerative colitis and mucous colitis I elaborated the following improved technique. The two principles on which this is based are: (1) that the cultures should, if possible, be made direct from the inflamed area and not from the faeces, and (2) the media used should be such as will support the most delicate bacteria with which we are familiar. I use a special piece of apparatus which I have designed and which is very simple in working. It consists of a glass bottle from which air can be exhausted by a hand pump or water pump. It is convenient to have a vacuum gauge fitted to the bottle to record the reduced pressure. Attached to the bottle by stout rubber connexions is a piece of glass tubing 12 to 18 inches long, the extremity of which is blown into a little cup which will accommodate a plug of cotton-wool. The patient is sigmoidoscoped and the

mucous membrane of the rectum and sigmoid carefully examined. If an inflamed area or patch of ulceration is observed the cultures are taken from this in the following way. A moist plug of sterile cotton-wool is placed in the cup at the end of the glass tubing and the long line of glass is passed up the sigmoidoscope till the cup, with its contained cotton-wool plug, is pressed on to the region to be examined. The tap of the aspirating bottle is then turned and gentle suction exerted for two minutes. The secretions and bacteria which are in the mucous membrane are sucked into the plug of cotton-wool; through the sigmoidoscope this can be seen to become coloured red if the patch of intestine is hyperaemic or ulcerated. I use a pressure of 20 centimetres on the gauge during the suction. After two minutes the "leech" is removed, the cotton-wool plug taken from the glass cup with sterile forceps and dropped into a waiting tube of nutrient broth. The "leech" may be applied to several places, being charged each time with a fresh cotton-wool plug.

For the cultivation of the bacteria which have been sucked by the "leech" from the ulcerated areas I use media such as serum agar, blood agar, or ascitic fluid agar. It is best to squeeze out the bacteria from the cotton-wool plug with a sterile glass rod which is pushed into the tube of broth and presses the cotton-wool plug against the bottom of the test tube. From this tube of broth streak cultures are made at once on to the solid media. The incubated plates yield a surprisingly small number of such common intestinal microbes as *B. coli*; they bring to light many types of bacteria not often met with in cultures of the faeces. It is beyond the scope of this paper to discuss the bacteriology of chronic inflammatory diseases of the large intestine which still await a clearer definition. My object is simply to report this improved technique, which I have found useful in my work at St. Mark's Hospital, in the hope that it may be helpful to others. The chief advantage this method possesses is that it provides an opportunity for the study of the bacteria living in the diseased patches of intestine without gross admixture with the unwanted population of the lumen of the gut.

THE SPREAD AND INCIDENCE OF PROTOZOAL INFECTIONS IN THE POPULATION OF THIS COUNTRY.

BY

A. MALINS SMITH.

In this paper are presented some of the main results of investigations on the intestinal protozoa of the inhabitants of Great Britain, investigations which were carried out at the Liverpool School of Tropical Medicine in the years 1916 to 1919. These results have already been published[1 2 3] and have also been summarized by Dobell[4] with other investigations of a similar nature. They are presented here because of their significance for public health workers and for clinicians, and because they have not yet received such wide dissemination as their importance deserves.

The Position in 1916.

In 1916 it was believed that *Entamoeba histolytica* was a parasite of man in the tropics and subtropics, and that it was absent from Great Britain and most temperate countries; that amoebic dysentery was a disease of tropical regions caused by this pathogenic amoeba; and that it was amenable to treatment by emetine, which had in fact a remarkably specific curative action upon it. It was known that in tropical countries the intestine of man was inhabited by other protozoa belonging to the classes Rhizopoda and Mastigophora. About the pathogenicity or otherwise of these, various opinions were held, but it was widely believed that one other—*Giardia* (*Lamblia*) *intestinalis*—was harmful. At that time no work had been done upon the occurrence of these other protozoa in the population of Great Britain. There was very little information as to the incidence of amoebic dysentery in any country, and there existed no statistics of the percentage of cases due to *E. histolytica* in any outbreak of dysentery. Medical opinion was to the effect that the almost complete absence of amoebic dysentery from this country implied the absence of the causal parasite. In consequence, if any person in this country suffered from amoebic dysentery or was found to pass *E. histolytica* cysts in his stools, some residence abroad, or some contact with persons who had been resident abroad, was immediately postulated.

Entamoeba histolytica found in Healthy Youths never out of England.

The first step in the investigations which have so profoundly modified this outlook as far as this country is concerned was taken when the stools of a number of healthy recruits in training at a camp in the vicinity of Liverpool were examined microscopically for protozoa. These youths were 18 years of age and had never been out of this country. The cysts of *E. histolytica* were found in a number of these stools, and there was no doubt that these cysts were morphologically indistinguishable from the cysts passed by people who had resided abroad. The recruits were all healthy, with no symptoms of dysentery, and it remained to test the pathogenicity of the *E. histolytica* they were carrying. Four kittens were fed on milk contaminated by the faeces of four of the cases.

A few amoebae were found in the faeces of one of the animals six days after the infective feed; on the twelfth day symptoms of acute dysentery developed, the animal passing mucus, blood, epithelium, and many amoebae. Acute dysenteric symptoms persisted to the death of the animal, which occurred on the twenty-third day. During the whole of this time large numbers of amoebae were passed with the faeces. Neither in the fresh nor in stained preparations could these be distinguished from those found in the stools of human beings suffering from acute amoebic dysentery. On *post-mortem* examination of the kitten a large portion of the mucosa of the large intestine appeared to be superficially necrosed. In scrapings, enormous numbers of amoebae were found. Scattered throughout the large intestine were small discrete ulcers. Bacteriological examination of the faeces of the case on which the kitten was fed, and also of the kitten itself during the period of acute dysentery, and of a scraping of the large intestine, were made by Professor Glynn. No bacilli of the dysenteric group were found.

Thus the youth in question was proved to be a healthy carrier of *E. histolytica* in the same sense as are "contact carriers" from the tropics.

Entamoeba histolytica found in all Sections of the Population of Great Britain.

Other sections of the population were afterwards examined and infections with *E. histolytica* were found in members of every one of these. The other intestinal protozoa were also found in all the groups. In all 1,098 army recruits, 450 adult civilians in hospital, 548 children under 12 in hospital, and 207 asylum patients (Whittingham) were examined. Not one member of these groups had ever been out of England. In addition, 504 asylum patients from another asylum (Rainhill), 470 of whom had never been abroad, were examined. The percentage of *E. histolytica* carriers in these groups, as found by only one examination per case, was:

Army recruits	5.6
Adult civilians	1.5
Children	1.8
Whittingham Asylum	9.7
Rainhill Asylum	4.2

Thus in every section of the population, including all ages and both sexes, these infections were found. This work, establishing the wide occurrence of *E. histolytica* in the home population, has altered fundamentally the point of view of any person dealing with a case of dysentery or of *E. histolytica* infection in this country. Since it is almost certain that such a frequent and widespread parasite has not recently established itself in this country, it is no longer necessary to presume foreign origin for any home case of amoebic dysentery or for any infection with *E. histolytica*.

Earliest Age of Infection.

The investigations among the children had aspects of further interest. It was established that an infection with *E. histolytica* had been acquired by a child in the third year of her life, and infections with *E. coli* and *Giardia intestinalis* had been acquired in the second year of life. Later Miss Nutt[4] at Leeds and Sheffield found infections of *Giardia* in a child of 3 weeks and in others of 3 months, 9 months, 11 months, and 12 months respectively.

Spread of the Infections.

As regards the spread of the infections further investigations were made in connexion with some of the cases of children who were positive for *E. histolytica*, and it was found that the families from which they came were much more highly infected than the average population. The findings for one of these families are given:

Protozoa Found.	Parents.		Children.					
	J. S.	L. S.	L. S.	F. S.	Ja. S.	J. S.	M. S.	D. S.
Entomoeba histolytica ...	+	+	+	+	+		+	+
E. coli		+	+	+	+	+	+	
Endolimax nana	+	+	+	+	+		+	+
Giardia intestinalis ...							+	+
Chilomastix mesnili ...						+		
Ages:	41	41	16	13	11	9	7	3

Thus in this one family only there were almost as many *E. histolytica* infections as were found in the 548 cases taken from single members of different families. Such families therefore form, in all probability, isolated pockets among a general population fairly free from infection. Further speculation as to the spread of these infections would perhaps be unprofitable.

Acute Amoebic Dysentery in this Country.

Since indigenous infections had been shown to be not infrequent, the question arose whether indigenous cases of acute amoebic dysentery occurred in this country. If they did, probably the place in which they were likely to be found was in a mental asylum, where outbreaks of dysentery still occurred. Accordingly an outbreak of dysentery at Rainhill Asylum was investigated, and there were found among 60 cases of acute dysentery 3 with pathogenic entamoebae in the stools. Two of these patients had never been out of England. All three were much improved by the administration of emetine, and all completely recovered. It was thus shown by microscopic examination that indigenous cases of acute amoebic dysentery do occur in this country, though it still remains almost certain that the great majority of the cases in this outbreak were bacillary in origin.

Conveyance of Entamoeba histolytica from One Person to Another.

The method of conveyance of the parasite from one person to another is clear in so far as we know that *E. histolytica* must be conveyed by contamination of food or drink with fresh faecal matter containing the cysts. The amoebae are very short-lived and cannot spread the infection. Even the cysts cannot withstand drying nor live long outside the human body. In the case of other similar diseases the suspicion of acting as carriers often falls upon domestic or other animals accompanying man. In this disease, however, there is no evidence of the intervention of any animal. The cat is easily infected with amoebic dysentery, which usually ends fatally in this animal. As far as the evidence goes, however, it seems certain that it never becomes a carrier—that is, that cysts are never found in its stools. A few other animals—the dog, the rat, the rabbit—have been experimentally infected, but there is no good evidence of the occurrence of the parasite in them except under experimental conditions. It is to be concluded that infection is direct from one human being to another. It can only take place by ingestion of fresh faeces containing the cysts. Flies may play a part in the conveyance of cysts, for Wenyon and O'Connor[5] have shown that cysts can pass through the fly without being injured. The excrement of flies, however, soon dries, and only that which is voided upon food and eaten almost immediately could be effective. Water may be contaminated with infective faeces and the cysts may be thus conveyed.

Significance of the Results.

The work which has established the existence of *E. histolytica* in many parts of this country, and has shown that in a special part of the population acute amoebic dysentery still exists, has a significance for the sanitarian. It shows that our personal and social hygiene is still far from what it might be. Differences in the different sections of the population tend to emphasize the significance of personal hygiene in this matter. The highest percentage of infections was found in an asylum population. There seems also to be a significantly high frequency of infection among miners, among whom certain helminthic infections are known to be prevalent. The environment in which they work is probably defective from the point of view of sanitation. The high figures for natives of tropical countries may partly depend on the same factor. Wenyon and O'Connor[5] found a very high percentage of infections (13.5 per cent. found on one examination) among 524 healthy natives in Alexandria. Nevertheless, that it is by no means easy to prevent the spread of these infections is seen from the fact that they occurred among 41 university and school cadets examined at Liverpool—youths whose home surroundings would be satisfactory. Some of the homes visited in the course of the investigations of Liverpool children were poor and dirty, but others were clean and comfortable, yet *E. histolytica* infections were found in both.

The tendency of this work, confirmed by and confirming most of the other work on this subject during and after the war, has been to reduce the importance of *E. histolytica* as a cause of disease. Although this parasite is widely prevalent in this country, yet dysentery is very infrequently caused by it. Nor does it appear now that the facts are very different in tropical countries. We owe chiefly to Dobell[4] the conception that *E. histolytica* occurs normally in the healthy carrier, who passes cysts, and is therefore the medium through which the infection is spread. In him the tissue of the intestine destroyed by the parasite is replaced at an equal rate by new tissue and so no dire results ensue. Any departure from this balance between host and parasite is dangerous to both—to the host because he contracts dysentery, to the parasite because in acute dysentery its chance of finding another host is very much reduced. This reduction depends on the fact that in acute dysentery the amoebae, which are powerless to spread the infection, are passed in the stools. Since the sufferer with acute dysentery is not dangerous to others, amoebic dysentery cannot become epidemic in the same sense as do many diseases of bacillary origin. Outbreaks of dysentery, whether at home or abroad, are mainly bacillary. Even in tropical countries only a small percentage of dysentery is amoebic. It must be noted, however, that acute amoebic dysentery may be more common in Great Britain than has been supposed. Laidlaw[7] found three cases of indigenous amoebic dysentery in no long period after he began to search for them. They may in this country be concealed under such names as "hepatitis," or "ulcerative colitis," for it was among such cases that Laidlaw found the examples just cited. Perhaps the chief significance of this work for the British physician is that he should have the possibility of amoebic infection in mind when diagnosing such cases.

Yet, when all is said, there remains an impression, which may be well founded, that the acute case is significantly less common in this country than abroad, in comparison with the number of persons infected with the parasite. The possibility that this impression is correct should be kept in mind, and wherever possible statistical evidence relating to it should be obtained. Speculations as to the cause of this difference are obviously of little value until we are quite sure that the difference exists.

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Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

EXTRAGENITAL CHANCRE.

THE situation of the chancre seems to make the following case worthy of record.

A Chinese woman of the farmer class, 23 years of age, married for four years, but without children, came to hospital complaining of considerable swelling and pain in the right eye of twenty days' duration.

On examination the whole of the conjunctiva of the right eye was found to be oedematous and chemotic. The cornea was clear. A hard mass occupied the bulbar conjunctiva below and to the inner side of the cornea. This mass had a very definitely cartilaginous feel, was well circumscribed, and was slightly concave forwards. It was ulcerated in the centre, leaving a raw area with a thin serous crust, which on removal produced a free serous discharge and a few fine points of haemorrhage. The whole mass could be dislocated outwards by making the patient look upwards and by drawing down the lower lid. The submaxillary gland on the same side was enormously enlarged and very hard, but the pre-auricular gland had escaped, and no other glands were palpable.

After a preliminary washing with saline, smears were made from the sore, and were stained by Noguchi's method. The slides showed *Treponema pallidum* to be present in very large numbers. The blood serum of both the patient and her husband were at this time negative to a modified Sachs-Georgi precipitation test. The husband and the father of the patient were seen at the same time, and no signs of a recent or old syphilitic infection could be found. Active syphilis in other members of the family was denied.

It is not possible to trace the source of infection in this case. Syphilis is very rife in this town (a large garrison town just outside the Great Wall of China), and a very large number of extragenital chancres are seen. In the course of two years' work in this place, extragenital chancres have been seen in the following situations: lips (several), tongue (fraenum and body), tonsil, mammae, abdominal wall, and rectum.

GILES A. M. HALL, M.B., B.S.

Mosse Memorial Hospital, Tatungfu, Sha, North China.

BISMUTH SODIUM POTASSIUM TARTRATE IN THE TREATMENT OF EPILEPSY.

IN this Territory there are many cases of epilepsy, and one meets numerous cases of epileptic insanity. In some of these cases I have found *post mortem* pachymeningitis with adhesions between the dura and the pia arachnoid. Considering that syphilis was the cause of this, I treated similar cases with weekly injections of the compound bismuth salt, in 3-grain doses intramuscularly. This treatment was begun in October, 1923. A report was sent to the P.M.O. of this Territory in December of that year, to be incorporated in his annual report. The acting P.M.O. has now suggested that I publish some notes of the cases treated.

Case A.—Admitted in October, 1923, suffering from epileptic insanity. Just after a severe fit this man broke the arm of another native with a stick. He was given 3 grains of the bismuth salt weekly, for six weeks. No fit occurred for nine months, and he appeared normal. On August 21st, 1924, he had three fits. He is now receiving 3-grain injections every four days, and there has been no further recurrence of the fits.

Case F.—Admitted in March, 1923, suffering from epileptic insanity. This man had, I understand, been sick for some years in his own village, but, as he had become very noisy and obstreperous, the chief of his village brought him to the administrative officer. In the mental hospital he could, with difficulty, be controlled, and had from time to time to be forcibly restrained, as he threatened to kill attendants and other patients. One curious symptom was noted: when an attack was about to come on he spoke and sang in a falsetto voice. The chief attendant observed that this always preceded a fit, or an attack of noisy obstreperousness. From October to December, 1923, he received ten injections of the bismuth tartrate. Since January he has been quiet and amenable, gives no trouble, and is quite rational.

Case K.—An epileptic maniac, aged 18, had had epileptic fits for at least three years. He was admitted because he killed his mother after an acute attack of epilepsy. Treatment by injection was started in October, 1923; the fits, which had been of almost daily occurrence, ceased after one week, and he became quite rational. Ten injections were given. This man received no injections after January, 1924. He was quite well till August, 1924, when he had a fit. Injections have again been started.

Case N.—A female, aged about 30, admitted under magistrate's order to the lunatic asylum on August 10th, 1924, suffering from symptoms of acute mania. She talked or shouted incessantly, slept very little, refused to wear any garments, and would not answer when spoken to. On August 12th she was disturbing the white and native staff to such an extent that she was given a 3-grain injection of the bismuth salt. The result was marvellous; she slept on that night, and has been quiet and fairly rational ever since. The injections are being repeated every four days, till ten have been given.

In my opinion, in the majority of insane natives in this Territory the insanity is related to syphilis. As a routine treatment now all patients receive injections of the bismuth salt. In cases where no improvement results I take it that the disease is not syphilitic in origin.

I add short notes of a case seen in the civil hospital.

A girl, aged 6, was admitted with epilepsy complicated with incontinence of urine each night. From October to December, 1923, she received weekly injections of 1 grain of the bismuth salt. After the first injection the fits, which had been of almost daily occurrence, ceased; so did the nocturnal incontinence. She was discharged in March, 1924, apparently cured. She was sent back to hospital in June because of a recurrence of the fits. She received other ten injections, and, so far, there have been no further fits. The incontinence of urine did not recur.

Whether the cure or relief of patients treated in this way will be permanent or not it is not yet possible to say; but when one considers the improvement in the condition of the patients themselves and the increased comfort of the attendants and other patients, and as long as one sees no bad results from the injections, I think it is well worth while to continue this treatment.

The bismuth sodium potassium tartrate used is that made at Nairobi by the Kenya Medical Department.

J. G. MCNAUGHTON, M.D.

Tanganyika Territory, East Africa.

ACUTE TORSION OF THE APPENDIX.

As I can find no record of this condition in the literature at my disposal I venture to record the case in the hope that it may be of interest.

The patient, a man aged 43, sent for me on October 5th, 1924, as he had severe cramping pains in his right side. He had felt pains for two or three days previously, but had been able to go about his work—selling butcher-meat from his cart in the streets. He had never had any previous illness that he could remember.

On examination, I found a hard, firm swelling over the appendix area and considerable tenderness on deep pressure. There was little rigidity of the abdominal muscles. The pulse rate was 100 and the temperature 98.2°. The tongue was dry and coated, and the breath offensive. He was removed to Hawick Cottage Hospital for operation.

Operation.—When I opened the abdomen some clear fluid escaped. A deep purple patch of fat presented at the ileo-caecal region. This was adherent to the parietes by recent adhesions, which were easily separated. The mass was then delivered. It was found to contain the appendix, which was acutely twisted near its base—like the pedicle of an ovarian tumour with twisted pedicle—and the fat was the mesentery of the appendix rolled round and round. The centre of the mass was quite black. The mass was removed in the usual way; it measured about 3 in. long and 1 in. broad. The abdomen was then closed. Recovery was uneventful, and the patient was discharged from the hospital on October 24th.

There was an excessive amount of subcutaneous fat, and the mesenteric fat was also increased in amount. I imagine that this unusual amount of fat in the mesentery of the appendix may have determined a torsion.

Hawick. A. C. MALLACE, *M.C.*, M.A., M.B., Ch.B.

POST-OPERATIVE THIRST.

THE boracic acid spray suggested by Dr. T. D. Harries (October 18th, p. 717) for this distressing condition seems to be quite efficient, but the prevention of it is even more desirable. This is carried out in abdominal operations by pouring into the peritoneal cavity, just prior to closure of the wound, a quantity of warm normal saline. A pint of fluid may safely be administered by this route. There is rapid absorption and no untoward effects. This treatment is not to be recommended in septic cases.

Dumfries. O. CARLYLE, F.R.C.S.Edin.

Reports of Societies.

NOTIFICATION OF PUERPERAL SEPSIS.

Combined Discussion at the Royal Society of Medicine.

The Sections of Obstetrics and Gynaecology and of Epidemiology and State Medicine and the Society of Medical Officers of Health united in a discussion at the Royal Society of Medicine, on November 6th, on "The notification of puerperal sepsis." Dr. H. Russell Andrews (President of the Obstetrical Section) was in the chair, and there was a very large attendance.

Origin and Scope of the Discussion.

The Chairman said that the idea of such a discussion originated in a letter addressed by Sir George Newman in May last to the Section of Obstetrics and Gynaecology, in which he stated that the Minister of Health was anxious to take such steps as were possible to reduce the incidence of maternal mortality, and particularly of puerperal sepsis, and asked for observations as to the administrative action which might suitably be taken. The Council of the Section referred the matter to a subcommittee, consisting of Sir Ewen Maclean, Mr. Aleck Bourne, Dame Janet Campbell, and himself, which reported as follows:

"Any case in which there is a rigor or a temperature of 102° or higher for twenty-four hours, during the first ten days after confinement or abortion, must be notified. Get rid of the official term 'puerperal fever,' and use in its place the term 'puerperal sepsis.' Puerperal sepsis is a febrile condition of the nature of wound infection, arising after labour or abortion, due to bacterial invasion from, or absorption of, products of bacterial action from some portion of the genital tract."

In reply to this Sir George Newman had pointed out how important the matter was, as it might influence future legislation, and therefore it was thought well to arrange for a combined discussion. Whatever reply was decided upon at that meeting might be taken by the Ministry of Health as the considered opinion of the two Sections and the Society taking part. The present position of the notification of puerperal sepsis was most unsatisfactory. Many patients suffering from this condition were left without adequate treatment, and the cases were not notified until death was imminent. Dr. Fothergill of Manchester had stated that in 1911-14, out of 200 areas, in 93 the total of deaths from puerperal fever was larger than the total of notifications. One of the results of the present discussion ought to be the provision of beds for women suffering from puerperal sepsis. Cases were sent to hospital frequently too late for treatment—chiefly adequate nursing—to be of value. The subject bristled with difficulties, but he called for constructive criticism. The discussion must be limited to administrative action, terminology, and definition of notification. Ample opportunity would be afforded at the Congress of Obstetrics and Gynaecology in London in April next to discuss causation, prevention, and treatment. He read a letter from Sir Francis Champneys, who suggested that a resolution should be sent to the Ministry of Health asking for arrangements to be made whereby the notification of all fatal cases—or, if preferred, all cases of puerperal fever—should be accompanied by the statement as to who actually delivered the woman. Until this was known, Sir Francis Champneys said, they could not get on the track of the cause.

Notification of Suspected Cases.

Dr. J. S. Fairbairn said that the general principle underlying the recommendation of the subcommittee was that notification was useless unless the early and suspected cases were included. He found it helpful to bear in mind the type of case that would be considered a danger to be nursed in a ward with other lying-in patients. True, the risk of contagion was very much less when the patient was already isolated in her own home, although then there was a risk of the conveyance of infection to others by doctor, midwife, or maternity nurse. In domiciliary practice, however, and in nursing homes and small maternity homes, there were not the facilities for the thorough investigation of suspected cases which a large hospital afforded, and the disadvantage might be set against the lessened risk of spread. Dr. W. E. Fothergill had remarked upon the curious fascination which notification possessed for some minds. The best way to escape from being fascinated was to look upon notification as a means to an end, the end being in this case the reduction of the septic death rate in childbirth. Administrative action following notification fell into two categories—one dominated by concern for the individual case, from which point of view it was necessary first to determine the nature of the infection and then to arrange for nursing and treatment, and the other by concern for the public health, which took the form of prevention of the spread of infection and the obtaining and collating of information. The cases notified as suspect should be narrowed down to true genital infection calling for special management and precaution to prevent spread. The care of the individual patient must, however, be kept in the forefront, and the public health measures made as little obtrusive as possible. The doubt must arise whether notification of all suspicious cases was a possibility, and, if it were, whether it would make much impression on the incidence of the disease. In confinements the temperature was often not taken or recorded properly, and many slight fevers escaped notice and developed into serious infections. Some conditions might cause relatively little disturbance to the patient herself and yet be extremely infectious. In all infections it was the carriers and the unrecognized cases which were the greatest danger. The wider casting of the net would certainly add to the burden of the practitioner who did much midwifery; moreover, patients and their households were not altruistic enough always to consider the point of view of the public health or the value of statistical information. One form of notification which did seem reasonable was an addition to the birth notification of the name and qualification of the person actually present at and responsible for the delivery of the woman. The speaker considered that the immediate notification of all suspected cases was out of the question; it would probably involve some amendment of the Notification Act, and certainly some years must elapse before effective measures following on such notification could be set up throughout the country. But was it not possible to organize in some areas obstetric consultations, bacteriological investigations, domiciliary nursing, and a certain amount of hospital accommodation, both for observation and treatment, in which areas practitioners might be asked to notify voluntarily cases of fever in childbed? Much valuable experience would be gained both to the administrative and practising sides of the profession.

Dr. R. Dudfield (M.O.H. Paddington) also spoke on the notification of suspected cases. He reminded the meeting that this question was considered by the British Medical Association in, he thought, 1906, and a report was published that any temperature of over 100° lasting for more than twenty-four hours should be regarded as indicating a septic case, and it was implied that this was a case for notification. He would like to see the profession in a position to certify suspected cases. At present the profession was handicapped by being obliged to say yea or nay. He thought also that the Ministry of Health should set up a committee of experts and that questionaries should be circulated to medical officers of health, and through them to the certifying practitioners, the returns being sent to the Ministry for reference to the expert committee. For this work the certifying practitioner ought to receive a fee. If such a procedure was followed it would render needless a great deal of the work of inquiry at present carried out by members of the staff of public health authorities. He suggested that the first part of the subcommittee's report be altered to read:

"Any case in which there is a rigor or a temperature exceeding 100° for twenty-four hours at any time during the first ten days following confinement or abortion must be notified in the first instance as a suspected case of puerperal fever."

Although there was a widespread desire to get the official term "puerperal fever" struck out, for legal purposes he thought the term should be retained; it was the term which was in use in other countries.

Better Supervision of Midwifery Practice.

Dr. R. A. LYSTER (M.O.H. Hampshire) said that investigation into the possible causes of maternal mortality always led to one result—namely, that the chief and almost sole cause was bad midwifery practice. The level of midwifery practice could be substantially raised by efficient supervision and inspection. The Midwives Act was intended to create a body of midwives practising under close supervision and inspection, but that intention had never been carried out. By influence through their societies midwives had successfully prevented the organization of schemes whereby their work could be properly checked and supervised, with the result that twenty years' working of the Midwives Act had resulted in little or no improvement in mortality connected with midwifery or mortality among newly born infants. The speaker referred in this connexion to the working of the Notification of Births Act, 1907; midwives, although they had to notify the birth within thirty-six hours, had succeeded, with the support of the Central Midwives Board, in preventing any official visits to the house by health visitors during the first ten days; and it was a striking fact that it was during those ten days that the mortality among mothers and infants had shown so small a diminution during the last twenty years. In an area in which for a time the health visitor called during the ten days it was notorious that nearly all breaches of the Central Midwives Board rules by midwives were discovered by the health visitor; it was also flagrant that a very large proportion of the ophthalmia cases discovered were noticed for the first time on the day when the health visitor first called. His experience was that a sufficient service of competent midwives—for which the Ministry of Health suggested that large public payments, either direct to midwives or to nursing associations, should be made—could be secured at once in most districts by increasing the supervision of their work. In practice the payment of subsidies to midwives in sparsely populated districts was unreasonably costly, and it was far cheaper and more satisfactory to provide maternity homes. With regard to notification, the speaker referred to the pathetic faith exhibited by some people in this procedure. Notification, unless accompanied by substantial schemes of practical utility, was worthless from the preventive point of view. A document issued by the Ministry of Health stated that there should be investigation by the medical officers of health of all maternal deaths due to childbirth and of all cases of puerperal infection whether fatal or not. Apparently it was to be left to the medical officers of health to get into all kinds of trouble and difficulty in making inquiries concerning the work of private practitioners. He hoped that no medical officer of health would undertake such investigations unless and until the medical profession assented to the proposal. This proposal of the Ministry should be considered at once by the British Medical Association, and that body should advise its members as to their attitude.

A General Inquiry into Puerperal Morbidity.

Dr. T. WATTS EDEN said that evidently the notification of puerperal fever was not satisfactory. Dame Janet Campbell had said, with official moderation, that it was unsatisfactory and incomplete, and Dr. W. E. Fothergill had stated that not 4 per cent. of the cases of puerperal fever were notified. To the speaker this was the salient fact of the situation. The present system of notification had completely broken down. Those who saw cases of puerperal fever in consultation were always asked two questions: was it a case of puerperal fever, and, if so, must it be notified? There was a good deal of honest doubt, especially in the early stages, as to whether a case was puerperal fever or not, and, even if it was, the practitioner liked to call it by some other name if he could. The idea was fixed in the public mind that if puerperal fever occurred the doctor was to blame. The doctor would notify tuberculosis or eruptive fevers, but not puerperal fever if he could help it. Until the support of practitioners was forthcoming there could be no progress. He thought it a mistake to approach the subject at all from the narrow portal of notification. What was required was to bring under review the whole field of puerperal morbidity. This would evade the difficulty caused by the reluctance of the practitioner to notify. How often was a mild febrile disturbance in the puerperium converted into a severe case of sepsis by injudicious management or some operative procedure? The whole field of puerperal morbidity could be explored if provision were made for the reception of midwifery cases at hospitals. The present provision was scandalously inadequate. If a system of puerperal visitation wards were organized to which practitioners were encouraged to send all the cases that went wrong—the lacerations that did not heal, the cases that became febrile—the notification of cases properly diagnosable as puerperal septicaemia would be made by the institution, not by the doctor, from whom the odium of notification would be removed. Such a scheme could not be undertaken under the voluntary hospital system, but only with State assistance. Dr. Herbert Williamson had suggested that it was a subject for a Royal Commission. That might be the enthusiasm of the obstetrician, but it was certainly worthy of inquiry by a strong committee, partly medical, partly lay. The evolution of some form of national midwifery service was overdue. Such a study as he had suggested would enable the Ministry of Health to get in touch with clinical realities and the practical needs of the situation.

The Difficulties of the General Practitioner.

Dr. C. E. S. FLEMMING (Bradford-on-Avon) said that notification was only a part, and by no means the most important part, of the process of prevention. He agreed with the proposal to replace the term "puerperal fever" by "puerperal sepsis"; the old term made notification a burden to the conscientious practitioner; it forced him to notify every case with a temperature or to look for a definite specific disease, and that without any spots or stigmata to guide him. There were, no doubt, conditions not due to sepsis in which there was equally a rise of temperature within ten days and lasting for more than twenty-four hours, one of the most frequent being influenza. The diagnosis and selection of cases for notification must be left to the medical man in attendance, who would be only too grateful if the suggestion made by previous speakers materialized that a second opinion should be made available. The speaker believed that notification at the present time in county areas was made to the wrong person, for it often happened that the practitioner was required, to his natural disinclination, to notify a case to a medical officer who was his rival in practice. He knew of a medical man who had a case of severe puerperal sepsis, and eventually discovered that the district midwife looking after the case was at the same time nursing two other cases in the same condition (both of them patients of the district medical officer), neither of which had been notified, nor had the nurse been informed that they were septic. Another reason why notification should be made direct to the medical officer for the county was that he was the officer controlling the midwifery service. It should be made not only a moral obligation but a statutory duty to inform the midwife or maternity nurse in attendance of the fact that a case was septic. He thought also that when a medical man giving ante-natal treatment discovered that the surroundings of the patient were not suitable he should have the duty of notifying the local authority. What was the good of notifying a septic case unless it could be removed out of harm's way and to some place where it would receive efficient treatment? At present, in most districts, the isolation hospital was the only suitable place.

A Comprehensive Definition.

Dr. W. BUTLER (Medical Officer, L.C.C.) asked how it came about, after so many years of statutory notification, that a disease remained so elusive. The truth was that, on the one hand, there existed a series of pathological phenomena associated with the puerperal state of so varied a character, both in origin and symptomatology, as to defy obligatory inclusion under any term or group of terms;

and, on the other hand, there was the tragic history of puerperal sepsis, the sombre background of the past projecting itself and presenting what, in the light of modern medicine, seemed an anachronism—a preventable catastrophe that would suggest a culpable responsibility. The general practitioner was not less solicitous than the medical officer that the dangers of childbirth should be reduced, but he approached the problem from a different angle, and he had personal interests which he naturally thought had a claim to consideration. The difficulties of the practitioner were real, and should be sympathetically apprehended. Dr. Butler thought that the suggestion of the subcommittee as to what cases should be notified had the merit of precision, and, quite fortunately, it embraced a variety of conditions which it would be incorrect and misleading to describe as puerperal sepsis—such, for instance, as a common cold, not infrequently contracted during labour, an attack of influenza, or the kindling of a latent tuberculosis. Why not call it a sustained puerperal pyrexia, and thereby get rid once and for all of a bugbear? Sustained puerperal pyrexia was a suitable condition for notification, although how far it was compatible with the provisions of the Infectious Diseases Notification Act to make known only a clinical condition common to a number of diverse diseases was another matter which need not be discussed at the moment. This would certainly be an innovation, but it would lead to administrative action involving the closest co-operation of medical officer and practitioner, and would be likely to be very fruitful in results. It was, in fact, the only kind of action appropriate to the circumstances, and if a departure from the stereotyped procedure had to be made and special measures devised accordingly, the occasion justified such an innovation.

Administrative Measures.

Dr. H. Scurfield (late M.O.H. Sheffield) said that all the speakers appeared to be agreed that the notification of puerperal sepsis had failed. One reason was an idea prevailing in many districts that sepsis occurring after miscarriage did not require to be notified. His own feeling was that it would be better to put forward a proper administrative scheme before bothering about the question of the exact condition to be notified. One speaker had said that the notification of tuberculosis was actually carried out; he did not think that medical officers would agree as to that, but the zeal in carrying out the notification of tuberculosis varied in different areas with the efficiency of the administrative measures that could follow upon notification. Another disease now notifiable, ophthalmia neonatorum, was like puerperal fever in the respect that it seemed to imply a slur upon the practitioner, but the notification of this disease was fairly well carried out, again because administrative measures had certainly become more efficient. This idea of a slur upon the practitioner would not interfere with the proper notification of puerperal fever when such administrative measures were available. In Sheffield the only institutional provision was the Poor Law hospitals, and that raised a big question. Such cases were not admitted into the infectious diseases hospitals under the control of the corporation; if they were so admitted in any area it would be necessary to engage a special staff of nurses, and to have gynaecological specialists at call. He urged that this question of a slight alteration in the definition of puerperal fever should be coupled with a strong recommendation that an administrative scheme be organized for every district, urban or rural.

Popular Prejudice against Notification.

Sir Ewen Maclean said that those familiar with the subject were aware that Wales was an "awful example" in the matter of maternal mortality, and in particular of mortality from puerperal sepsis. When the figures for the country generally were 4.11 deaths per 1,000 births, the figure for Wales was 5.41, and the single factor which was most prominent in these rate figures was puerperal sepsis. The Consultative Council of the Welsh Board of Health was so much impressed with the high puerperal mortality in Wales that it sought and obtained the consent of the Ministry of Health to visits by its members in several parts of Wales to investigate conditions on the spot. In Wales, as in other parts of the country, non-notification was largely practised. The cause for this which emerged in the course of the inquiry was one which went rather deeper than the suggestions made in the present discussion. Directly or by implication the blame had been laid upon the doctor or the midwife, but the real reason why notification was not much more successful was found to be, in Wales, the extraordinary complacency of the people themselves. They did not mind whether the condition was notified, and in many cases they did not want it to be notified. It was the patient who raised objection, or at least was indifferent. But if it became a matter of experience that notification resulted in advantage to the individual patient, then notification would become a popular thing, and this would sweep away all the disabilities now attached to notification by practitioner or midwife.

Hospital Accommodation for Puerperal Cases.

Professor Louise McIlroy considered that notification under present conditions would always be a failure. It would always bring practitioners into disgrace. Enormous courage was required on the part of the practitioner to suggest it to his patient. If he was conscientious he had many black marks against him at the Ministry of Health, while the unconscientious practitioner had a clean record there. Again, to rely on temperature as a mark of puerperal sepsis was out of date. Was it to be said that a case of puerperal sepsis with streptococci in the blood was in the same category as another case in which there was a slight laceration of the cervix and a temperature and which cleared up after a day or two? Another reason for the failure of notification was the lack of adequate treatment for the notified patient. She agreed that some influential committee should sit on the question of the whole organization of obstetric practice, and one of the great reforms which the Ministry of Health might bring about would be the setting up of a large hospital, preferably in London, devoted entirely to the treatment of puerperal sepsis. If a case were notified to the medical officer of health of a district he had no power to carry out any adequate treatment, and patients did not like to be sent to a Poor Law infirmary. This discussion on notification was merely a small part of the question. Another matter which might be taken into account was the absence of facilities for practitioners to take intensive courses in midwifery.

Dr. E. W. Goodall (medical superintendent North-Western Fever Hospital) said that cases of this character had been admitted to the infectious fever hospitals of the Metropolitan Asylums Board since 1912, and were placed under the charge of the medical officer who had been in the service the longest and had the most experience of this disease; moreover, the authorities of the hospital were always at liberty to call in specialists, and frequently did so. The misfortune was that many of the cases came too late—practically dying—while others which came were trivial cases, not puerperal sepsis at all. It would be a good thing to concentrate cases of puerperal sepsis in one or two hospitals.

Other Points in Discussion.

Dr. Mary Kidd regretted to hear so much criticism of midwives, who were an excellent, hardworking body of women. They were ill paid, and incidentally it would be a good thing if local authorities could make them an allowance for rubber gloves and sterilized outfits. With regard to health visitors, many mothers of the poorer class would resent the appearance of a health visitor in the very early days after confinement. Many of these health visitors knew nothing about midwifery, and their interference might be hard on the midwives. With regard to Poor Law institutional accommodation, this might be acceptable if only the relieving officer could be got out of the way.

Dr. Stevenson (Registrar-General's Department) said that it would be useful to know in whose practice—that is, doctors' or midwives'—these cases of puerperal sepsis occurred. This could be readily established from the records. He had been struck by the fact that, immediately after the war, when, presumably, the proportion of cases

attended by midwives declined owing to the return of practitioners to civil duties, there was a sudden and considerable rise of mortality from puerperal fever. He added that the Registrar-General no longer used the term "puerperal fever," but "puerperal sepsis." His own view was that the former was the proper term, but strong representations were made a few years ago, and he bowed his head to the storm.

Dr. J. ROBERTSON (M.O.H. Birmingham) agreed with previous speakers that it very frequently happened that cases arrived at hospital so late that it was impossible for the best specialists to prevent a fatal issue. The whole question of obstetric administration needed to be reviewed, and he was convinced that not only practitioners, but midwives and local authorities, desired to co-operate in a general scheme for the betterment of midwifery.

Dr. REMINGTON HOBBS thought that the limitation of notification to cases which had a rigor or a temperature of 102° would leave a vast number of patients in jeopardy. It would leave many women in pain and suffering for days when they could be relieved. Many cases did not show these manifestations; some, indeed, ended fatally in which the temperature had been little above normal. He would like to add to the definition that there were cases in which the uterus became absolutely obstructed and others in which it became partially obstructed, and that septicaemia could occur in both.

The Chairman (Dr. RUSSELL ANDREWS) said that the discussion had been very useful, and it remained now for the subcommittee to draft a reply to the Ministry of Health. Whatever answer was sent would deal, not with small points, but with broad policy, and would most probably include a request for such an inquiry as had been suggested by Dr. Eden and other speakers.

TUMOURS OF THE BREAST.

A MEETING of the Aberdeen Medico-Chirurgical Society was held on October 30th, when the President, Dr. G. M. DUNCAN, delivered his presidential address on tumours of the breast.

Dr. Duncan's experience included several hundreds of such cases. After some preliminary remarks upon the importance and difficulties of histological examination, he dealt first with the carcinomas. Points of interest in these tumours were the rarity of their occurrence in the male breast (in his series only six occurred in males), the difficulties of diagnosis in the early stages, and the extraordinarily high percentage of carcinoma in the case of breast tumours. Dr. Duncan described the method of rapid diagnosis by examining sections during an operation, and thought that this method might be more extensively used, provided that the pathologist had the necessary experience of preparing and diagnosing such sections. Illustrative cases were described where the method had been of considerable value. The different varieties of breast cancer were then described, and special reference was made to the difficulty of differentiating cancer commencing in a mastitic breast and of distinguishing the malignant types of papilliferous cyst-adenoma. Dr. Duncan drew four general conclusions. (1) Cancer of the breast in young women tended to be much more malignant than in those of greater age. (2) Cancer associated with inflammatory conditions of the breast often tended to be peculiarly malignant. (3) As a general rule, the more cellular the growth the more malignant it was. (4) It was unwise to draw merely from the size of the growth any definite conclusion as to malignancy locally, and also as regards the occurrence of metastatic deposits. Cases were cited to show that whilst a large growth might be removed with complete success, rapid local recurrence or the development of metastatic deposits might follow the removal of a small growth. Emphasis was laid on the occasional occurrence of metastatic growths producing definite physical signs, where the primary tumour in the breast was so small as to require the most careful examination for its detection. Dr. Duncan then described other types of breast tumour, such as fibro-adenoma and the very rare sarcoma; he referred also to inflammatory conditions, including syphilis, and tuberculosis. He suggested that some of the vague fibrotic conditions found in the breast might be of syphilitic origin.

THE SEMON LECTURE.

MALIGNANT DISEASE OF THE OESOPHAGUS.

ON November 6th, with Sir WILMOT HERRINGHAM, K.C.M.G., C.B., in the chair, Dr. I. GUISEZ (of Paris) delivered the University of London Semon Lecture for 1924 on malignant disease of the oesophagus. The lecturer spoke in French and illustrated his remarks with numerous lantern slides.

Dr. Guisez stated that cancer was the most frequent affection of the oesophagus; it occurred in about half the patients suffering from disease of this organ. It was six times more frequent in males than in females, and began for the most part between the ages of 55 and 65, although the youngest patient referred to by Dr. Guisez was only 14 years of age. The most frequent site was the middle third, and after that the inferior third of the oesophagus. Inflammation of the mucous membrane due to chronic irritation, especially of alcoholic origin, was the most important etiological factor, but the lecturer also drew attention to the effects of psychical factors which produced spasm of the oesophagus, and he quoted instances of patients who had developed carcinoma of this part after suffering for years from spasm of psychical origin. In the course of inflammation of the mucous membrane patches of leucoplakia often developed, and it was in these patches that carcinoma appeared later.

Symptomatology.

Coming to the symptoms of carcinoma of the oesophagus, Dr. Guisez stated that dysphagia occurred in 98 per cent. of cases. This dysphagia was painless and it began very abruptly, the patient suddenly finding difficulty in swallowing a morsel of bread or meat. This painless beginning was responsible for the so-called latent period of the disease, pain only occurring when the growth invaded neighbouring structures. Another frequent symptom was excessive salivation, a simple hyperproduction caused by the increased length of time during which food had to be masticated. Dr. Guisez emphasized that the tumour rarely surrounded completely the wall of the oesophagus, so that stenosis was uncommon in the early stages and dilatation with the so-called regurgitant vomiting was only a terminal phase. The extreme emaciation seen in this disease was due solely to starvation: it was not a malignant cachexia. Other minor signs included the expectoration of blood-stained phlegm, a peculiar fetor of the breath, and a symmetrical coating of the base of the tongue often associated with lingual leucoplakia.

While spread of malignant disease of the oesophagus by metastases in the veins and lymphatics was rare, spread by continuity frequently occurred. Extension to the mediastinum of the tumour or the growth of secondary glands gave rise not only to pressure on the air passages and nerves, but also to inflammation and destruction of certain nerve trunks. The left recurrent laryngeal was often affected; this was found to be the case in 20 per cent. of patients, and sometimes both laryngeal nerves were involved. The trachea and especially the left bronchus were often compressed, and perforation occurred as a later disaster. Pulmonary complications such as bronchopneumonia and gangrene of the lung frequently arose from inhalation of septic material, and extension of the growth to the pleura sometimes occurred. Pulmonary tuberculosis was a very rare complication. Severe haemorrhage following the perforation of a large vessel was not infrequently a cause of death in this disease.

Clinical Varieties.

Dr. Guisez next dealt with the clinical varieties of malignant disease of the oesophagus. A latent form did occur where the growth was only discovered accidentally, but such was very rare. Evolution of the disease in general was slow, but in young subjects it was often terribly rapid. In carcinoma of the upper part of the oesophagus the disease was usually painful, with early dysphagia and voice changes, while in the region of the cardia the signs and symptoms were those of malignant disease of the stomach. An important form of the disease was that following inflammatory stenosis, when carcinoma frequently developed in the part immediately above the cicatricial ring. Sarcoma of the oesophagus occurred very rarely, and was especially painful.

Carcinoma secondary to growths in the trachea and in the breast had also been reported. Multiple growths sometimes occurred, and in cases treated by radium the growth sometimes appeared in other parts of the oesophagus while the primary carcinoma remained fibrosed. Apart from oesophagoscopy, the physical signs of malignant disease of the oesophagus were few. The passage of a tube or bougie revealed only the presence of stenosis, and a radiographic examination after an opaque meal showed little more. Direct examination through an oesophagoscope, however, would show the growth in its earliest stages. Dr. Guisez then described his method of using this instrument.

The common varieties of oesophageal growths were polypoid, ulcerous, and scirrhous in type. The first consisted of more or less pedunculated exuberant masses of epithelium which occupied the lumen of the canal and bled freely on being touched. The ulcerous form consisted of infiltrated patches of denuded epithelium with raised, hard edges. The scirrhous variety was rare except in the lower third of the oesophagus; it consisted of hard, fixed masses under the epithelium which rapidly infiltrated a segment of the wall and gave rise to stenosis.

These three varieties were sometimes combined. The constant features were the immobility of the growth and the bleeding on touching, while a microscopical examination of portions removed through the oesophagoscope would clinch the diagnosis. Malignant disease of the oesophagus had to be diagnosed from simple stenosis, from spasm, and from pressure on the oesophagus from the outside, and the oesophagoscope would enable any of these conditions to be eliminated.

Prognosis and Treatment.

The prognosis of the disease was naturally grave, but factors such as the slowness of the growth, the absence of pain, and the relative absence of generalization rendered disease in this part not so distressing, at any rate in the early stages, as malignant disease of other portions of the alimentary canal.

The ideal treatment of carcinoma of the oesophagus was complete removal or destruction of the growth. Surgical removal was up to the present generally out of the question. Attempts had been made to resect growths of the upper end of the oesophagus, but the mortality rate was very high. Intrathoracic growths had also been operated upon, but only one successful case was so far reported: in 1919 a patient operated upon by Thoreck was still living, eight years after removal of the growth.

Application of radium seemed a more hopeful method of treatment, particularly as the growths generally consisted of squamous epithelium of the basal-celled type, which was most susceptible to the action of radium. Dr. Guisez stated that he had employed radium in the treatment of 270 cases during the last fifteen years, always after a microscopical confirmation of the nature of the growth. In some cases the use of radium proved purely palliative, but in 39 cases life had been prolonged for more than eighteen months, and in several the growth had not reappeared—in one case for as long as eleven years. The disappearance of these tumours was watched through the oesophagoscope and generally no trace was left.

The lecturer then described his methods of using radium. It was essential that the exact site of the growth be known, that the patient be not too exhausted, that neighbouring structures be not involved, and that the patency of the tube be still sufficient to allow radium to be applied. The distance of the growth from the mouth was first accurately measured and radium introduced on a special carrier so that it was exactly opposite the neoplasm in the oesophagus, the upper extremity of the carrier being firmly fixed by tapes round the head. These carriers were special long sounds, and were much to be preferred to the usual short sounds, which were very liable to slip up above the growth. The dosage usually employed was about 10 to 12 centigrams of radium bromide in two or three tubes covered with very thin platinum screens (1.5 mm.). Five or six applications of up to ten hours every other day were generally given. If the growths were observed through the oesophagoscope the first thing which happened was the disappearance of the tendency to bleed on touching with a sound, and in favourable cases the growth gradually disappeared. (Some striking illustrations, drawn from actual oesophagoscopic views, were shown to demonstrate this.) In summarizing the results of this treatment, Dr. Guisez remarked that in recent years they had been much more favourable, particularly when it was remembered that he had an increasing number of advanced cases sent to him.

The lecturer finally dealt with other palliative methods of treatment, referring to the operation of gastrostomy, which was often, he said, delayed too long. He also described the use of soft rubber tubes of the Pezzer catheter type, which were more easily tolerated than the solid tubes usually recommended, and he regarded such intubation as preferable to gastrostomy.

PROGRESS IN PREVENTIVE MEDICINE.

Dr. McVail's Address.

The presidential address was delivered by Dr. J. C. McVail before the Section of Epidemiology and State Medicine of the Royal Society of Medicine on October 23rd. Taking the progress of preventive medicine as his subject, the President reviewed the advances that have been made since the commencement of the modern sanitary era, when William Farr began his great work at the General Register Office, and then proceeded to indicate the directions in which further progress may be made.

Early in his official experience Dr. McVail became impressed with a fact which had since become obvious to the most cursory observer. In modern schemes of public assistance there was risk of diminution of the sense of personal and family responsibility, and a tendency to rely on imperial taxes or local rates for services which should be provided by individuals for themselves and by parents for their children. No progress could be regarded as satisfactory which tended to undermine a man's independence and strength of character. In order to guard against such results, whatever measures were adopted in the future should be subject to three principles: (1) Insurance in the provision of services which the individual cannot be safely left to secure for himself. Definite personal contribution to a fund created beforehand for meeting the cost of contingent outlay on behalf of individuals was incomparably better than resort to current rates and taxes. (2) The establishment in practice of the principle of conditional relief as distinguished from unconditional relief, and exercise of due discipline over beneficiaries. (3) Effective education in personal and family health, especially of parents in the rearing of their children; education in self-reliance and foresight and in the responsibilities of citizenship. Subject to these principles, Dr. McVail emphasized two of the directions in which further progress should be made—the routine medical examination of individuals apart from illness and the concentration of matters relating to health—alike of the community at large and of the pauper class—under a single authority.

In 1907, at the request of the Royal Commission on Poor Law, Dr. McVail investigated Poor Law medical relief in England and Wales, and in a memorandum to his report advised that systematic medical inspection should be established in respect of all ages of life. The family doctor, he said, should at reasonable intervals offer to make examination of those for whose health generally he is responsible. He would acquaint himself with the family history, and note pathological tendencies requiring to be checked. With regard to the children, he would note their physical condition as a whole, their state of development in relation to age, indications of rickets, tubercle, or glandular disease, defects of sight or hearing, and enlargement of tonsils. He would give advice as to diet, bathing, fresh air, exercise, and the like. In connexion with the occurrence of actual illness, he would ascertain whether there was any threatening of dangerous sequelae, such as endocarditis after acute infectious disease. He would note whether the child's nervous system was being properly developed, and its functional activity sufficiently restrained. As regards the school child, he would see whether school work was being overdone, whether the child was being taught to practise steady application in any specified task, whether it was

being permitted to read books of too exciting or too advanced a character, whether it was being sent sufficiently early to bed and made to rise early enough in the morning, whether it was being punished unwisely for faults due to its physical and mental condition. As the child continued to grow into youth, note would be taken whether athletic exercise was excessive and injury to the heart or other vital organ threatened; whether, on the other hand, the youth was leading too sedentary a life. When the time came the doctor would advise as to the most suitable occupation, having regard to the general condition of health. Among women he would see that due care was taken to prevent mischievous sequelae of childbirth, such as uterine displacements or inflammations. Among men he would observe any tendency to trade disease, whether their employment was such as made special calls on any vital organs, and if so whether these were reacting properly to the stimulus or threatened to break down. Independently of age, sex, and occupation, the inmates of a household would be offered a general examination of their vital organs, and advice would be given where it appeared to be necessary. In old persons attention would be paid to the condition of the arteries in relation to apoplexy, and to parts likely to be attacked by cancerous disease.

Though periodical medical examination did not commend itself to the Royal Commission, there had since that time been a remarkable development on the lines indicated. Infant welfare, child welfare, school medical inspection and treatment carried out the principle as regards the young, though the work was not done by the family medical attendant but by school doctors and nurses. Even as regards adult life much progress was now being made. In America several of the large life insurance companies provided and paid for medical inspection of the insured. They did so, not on grounds of benevolence, but of economy and finance, and it was claimed that a large saving in life and capacity for work was made under this scheme. The work was done by medical men employed, not directly by the insurance companies, but by a life extension institute.

Evidence was accumulating rapidly to show that this common-sense method, generally applied and followed by necessary remedial treatment or regulation of personal hygiene, would do more to prolong health and vigour than any other measure. During the administration of President Roosevelt the system was introduced into the United States Army in respect of commissioned officers, and it was reported to be of great value in conserving health. A circular by the War Department in 1921 urged the necessity of examinations being carried out with thorough attention to detail, so as to enable the Department to apply practically, on a large scale, the principles of health preservation. Between 1914 and 1921 the Metropolitan Life Insurance Company authorized nearly 95,000 physical examinations, and reported that it had been established to the satisfaction of the company that periodic medical examination was justified by the benefit in added life expectancy to the policy holders. The question was raised in the address, how far the average general practitioner was at present qualified by his training to detect the very beginnings of disease, but on that point attention was drawn to the fact that under the General Medical Council's regulation such training is now an essential feature of the whole medical curriculum. Periodic examination should never be made without the free consent of the individual—the adult for himself, the parent for the children.

The second matter discussed by Dr. McVail had reference to the Poor Law. He supported the view that there ought not to be two separate sets of local authorities dealing with health—one for the community at large, the other for the pauper class. The health functions of the boards of guardians should be transferred to the local authorities under the Public Health Acts. The Majority Report was, however, against the policy of "break up" of the Poor Law, including the transference of health functions. Recent reconsiderations by a specially appointed body had resulted in a reversal of the majority conclusion on the subject, but the important point was that it should be the duty of the health authority to take charge of the health of the pauper class, not only in the interest of the latter, but of the population at large. Excluding lunatics and vagrants, paupers numbered perhaps only about 25 per 1,000 of the population; but pauperism, though destitution was its legal criterion, connoted far more than mere poverty, and whether it resulted from tuberculosis or alcoholism, instability of character, or other cause, the public interest required that paupers be under most skilled control in respect of health and character. Doubtless many boards of guardians went beyond the limits prescribed for them, and on the other hand the area and population under many a public health authority were far too small for efficient administration. But the situation should be frankly faced and a great reform in the whole scheme of local government be undertaken.

Finally, Dr. McVail dealt with the familiar argument that their sanitary efforts would simply result in the widespread survival of the unfit, and lead ultimately to the production of a degenerate race. He pointed out that, assuming that one-tenth of the births fell below the line of viability during the first ten years of life under present sanitary conditions, and that these could be saved by improvement in the environment, it must not be forgotten that the remaining nine-tenths also shared in the benefits of the improved conditions. If it was considered a loss to have preserved the weaklings, there was, on the other side of the account, nine times the gain in the form of increased vigour of the fit; and the same conditions which strengthened the weakest made also for the survival of the fittest.

X-RAY TREATMENT OF UTERINE FIBROIDS.

A CLINICAL meeting of the Newport Medical Society was held at the Royal Gwent Hospital on November 5th.

Dr. T. I. CANDY read a short communication on the treatby x rays of menorrhagia due to uterine fibroids. The type of case he considered best suited for this method of treatment was menorrhagia occurring in a patient over 40 years of age, causing weakness and impairment of the general health, and postponing the onset of the menopause. It was necessary to exclude the presence of malignancy and suppurative pelvic conditions. His practice was to administer at one sitting the dose necessary to produce amenorrhoea. The improved methods of measurement now available and the increase of knowledge of the biological action of x rays enabled this to be done with a considerable degree of precision. He found that the best time for treatment was within the first few days after the cessation of menstruation. The next menstrual period came on as usual, but the loss was always very much reduced, and thereafter complete amenorrhoea became established. In each of the twelve selected cases which he had treated the clinical results had been all that could be desired.

Dr. MORRELL THOMAS showed a pathological specimen from a case of haematometra following pregnancy. Dr. CARVETH JOHNSON showed a case of aneurysm of the femoral artery associated with dilatation of the aorta. Mr. R. J. LEE reported upon a case of sarcoma of the upper jaw in which the growth retrogressed in a remarkable manner without treatment, but which subsequently recurred. The diagnosis had been confirmed by pathological examination. The President, Mr. R. J. COULTER, showed a small piece of fine copper wire which he had removed from the vitreous of a patient who had been struck on the eye by a clod of earth. Dr. INGRAM showed a case of gumma of the lip successfully treated three years ago, and which now showed, on x-ray examination, extensive deposits in both lungs.

ON October 21st Dr. J. A. MURRAY delivered the presidential address to the Section of Pathology, Royal Society of Medicine. He dealt with the possibility of remedying the increasing bulkiness of the literature of experimental pathology by developing a pictographic convention which would obviate, or at any rate reduce, the necessity for long verbal descriptions. The difficulties in the way of such a change were exemplified in a series of charts of experiments in cancer research shown on the epidiascope; and the speaker recommended to the members of the Section the making of further experiments on the method of presentation of their results.

Reviews.

INTERNAL SECRETIONS.

A work on the *Biology of the Internal Secretions*[1] by Professor F. X. Dercum of Philadelphia, who described adiposis dolorosa as far back as 1888, would in any case attract attention, and the interesting and suggestive manner in which it deals with the endocrine factor in development, in subnormalities, in neoplasms, in nervous and mental diseases, and in heredity, more than justifies this anticipation. This comparatively small book contains much original thought and its hypotheses break new ground; but, though cautiously made, some of these new conceptions can hardly be regarded as proved until confirmed by the necessary research they may well stimulate. Tracing the internal secretions from the cellular products of the protozoa into the higher animals, stress is laid on the interrelations of the endocrine glands, and it is definitely stated that there is no uniglandular disorder, for more than one endocrine gland is always involved, possibly all of them, and accordingly the relations of the various glands are fully discussed.

Perhaps the most striking points in this mature expression of the views of an experienced physician are the importance he ascribes to the thymus gland and his suggestion that the cause of malignant disease may be disorder of the endocrine glands. To the pineal gland also Professor Dercum attributes considerable importance as a controlling influence during the period of growth of the body; it undergoes involution at the time of puberty when its work has been completed, and accordingly the symptoms of pineal disease, mainly due to hypopinealism, are explained as due to premature removal of its restraining action. Professor Dercum lays much stress on the endocrine function of the epithelial thymus (Hassall's corpuscles). He considers that this provides a substance favourable to lymphocytic life, and that in the status lymphaticus, which is regarded as an expression of inherent feebleness of tissue development, it secretes a vagotonic toxin responsible for thymic death. Further, he suggests that enlargement of the thymus, as part of the feeble state of development, leads to overactivity of the antagonistic thyroid and so to exophthalmic goitre; and that as a result of this the chromaffin system also takes on excessive activity, and occasionally the anterior lobe of the pituitary enlarges, also in order to overcome the depressing effect of the enlarged thymus, as is shown by acromegalic features. Indeed, acromegaly is ascribed to an enlarged thymus stimulating the anterior lobe of the pituitary to overactivity. As the parathyroids contain thymus elements they are placed in synergic relation to the thymus and in antagonism to the thyroid. Hypoplasia of one endocrine gland leads to hyperplasia of the antagonistic glands, and disease may result. Enlargement of the thymus and lymphatic system is thought to play the principal part in disturbing the balance between the endocrine glands and so favouring the development of neoplasms; for the healing of abrasions, fissures, and ulcers, if no longer controlled by the sympathetic group of endocrine glands (the adrenal medulla, the posterior pituitary, and thyroid), may take the form of riotous hyperplasia. This hypothesis helps to explain the usually accepted influence of chronic irritation in the production of new growths. But the statement, apparently made in support of this view, that primary malignant disease of the thyroid and of the chromaffin system is practically unknown, cannot be accepted.

The discussion of the relation of the endocrine glands to nervous and mental diseases is especially interesting, as coming from such a distinguished neurologist; neurasthenia is regarded as the result of functional failure of the chromaffin system, the thyroid, and the pituitary in a neuropath—that is, an individual with a morphological and biological defect in the endocrine glands. In the chapter on neuropathy and the problem of heredity the transmission of acquired characters is firmly asserted and Weismann's theory controverted on the grounds of clinical experience.

[1] *The Biology of the Internal Secretions.* By Francis X. Dercum, M.D., Ph.D. Philadelphia and London: W. B. Saunders Company. 1924. (Post 8vo, pp. 241. 14s.)

ANAPHYLAXIS.

The title of Dr. Cranston Low's monograph, *Anaphylaxis and Sensitisation*, scarcely reveals the wealth of material dealt with by the author, who, besides giving a full analysis of anaphylaxis, has made a notable contribution to the pathology of diseases of the skin.[2] No problem directly or indirectly related to anaphylaxis has been overlooked in this survey, which is brought down to as late a date as the present year. Some idea of the scope of the work may be obtained from an enumeration of the subjects examined: Anaphylaxis in man, urticaria, drug eruptions, the erythemata, sensitization in tuberculosis, syphilis, and fungus infections, dermatitis venenata, dermatitis exfoliativa, focal infections, sensitiveness of the skin to light, tests for cutaneous hypersensitiveness, and finally desensitization. Dr. Low makes it quite clear that there is no one explanation acceptable by all the workers on anaphylaxis regarding its own physico-chemistry or the relations of the sensitizing substance (anaphylactogen) to the antibodies or ferments to which presumably it gives rise.

The relations of anaphylaxis to immunity must be very close, and Dr. Cranston Low, following Vaughan and Wheeler, summarizes them thus: the injected foreign protein causes the tissues to produce a specific ferment (antibody) which splits the protein into a non-toxic and a toxic portion. Any "specificity" in the reaction is due to the non-toxic moiety. The toxic portion, common to all proteins, causes the morbid stimulation of nonstriated muscle, which is the essence of anaphylactic shock; hence the uniformity of symptoms in the same species of animal whatever the protein used. When the ferment splits up the protein (bacterium, etc.) before it has time to multiply, the animal is said to be immune. When the cleavage is less prompt, but sufficiently so to break up the protein before it elaborates the fatal amount of poison, the animal sickens but recovers. When the action of the ferment is still less prompt, the protein elaborates enough poison to kill the host. In an animal which has recovered, the proteolytic ferment is stored in the cells of the body as a zymogen, which is activated by the second injection of the same protein—this is anaphylaxis. This is by no means the only sort of explanation of anaphylaxis that can be given. Friedberger's, for instance, is based on Ehrlich's side-chain theory, as follows: the injection of the foreign protein calls forth the production of receptors which neutralize the antigen. Similar receptors continue to be formed, but remain "sessile" in the cells; when the protein is injected a second time the antigen combines with the antibody and complement to form "anaphylatoxin," which, being a poison, produces the symptoms of shock. This theory explains the absence of complement from the blood in anaphylactic shock.

One of the most interesting chapters is that on hydroa aestivale, which is a discussion of the biochemistry of photo-dynamic sensitizers. It appears that the worst cases of buckwheat poisoning in cattle occur when white or spotted animals eat the plant when in bloom. One of the symptoms is an itching erythema. Black animals are not affected, nor even are white ones if kept indoors or under cloudy skies. White animals put out into the sunshine rapidly develop the dermatitis. Ultra-violet light is therefore one of the causal agents. But buckwheat contains phytoporphyrin, an ally of chlorophyll and of haematoporphyrin. The inference is that the pigment is a photic sensitizer. Now in hydroa aestivale haematoporphyrin is very often found in the urine, and is presumably in the blood. The inference here is that that pigment is the photic sensitizer of the skin in which there is induced a destructive process. Chlorophyll or haematoporphyrin added to a suspension of red blood cells in a strong light causes them to be haemolysed, while in a control tube in the dark no haemolysis occurs.

To such an extent are clinical conditions being brought under the category of anaphylaxis that Dr. Low writes: "Taking everything into consideration, the course which acute fevers run can be explained fairly satisfactorily on the assumption that they are due to bacterial anaphylaxis."

[2] *Anaphylaxis and Sensitisation, with Special Reference to the Skin and its Diseases.* By R. Cranston Low, M.D., F.R.C.P. Edinburgh: W. Green and Son, Ltd. 1924. (Demy 8vo, pp. xiii + 384; 16 plates, 7 half-tone illustrations. 25s. net.)

PRACTICAL BIOCHEMISTRY.

WE heartily welcome *Elementary Practical Biochemistry*,[3] by Professor W. A. OSBORNE and Dr. W. J. YOUNG, lecturer on biochemistry in the University of Melbourne, as one of the best handbooks to the laboratory for the junior student that has been published in English. But it is more than a laboratory guide, for it gives, under the heading "Theoretical" (didactic would be a better term), a summary of the points of physiological interest in the subject about to be dealt with practically.

The treatment throughout is condensed without any sacrifice of clearness. A number of topics are introduced which are of the utmost importance for the beginner, but which are hardly ever dealt with sufficiently fully for him in his textbooks; some of these are "basal metabolism," colloids, and hydrogen-ion concentration. A feature of the book is that certain subjects of special importance for veterinary students are discussed. The treatment of vitamins, chemistry of milk, preservatives of food, and drugs in the urine is admirable, and just what the junior man should know. The book is no mere repetition of a course which might have been excellent twenty years ago—it is up to date; its authors are alive to present-day requirements.

The only quantitative estimations described are those for the chlorides and phosphates of urine, for urea and for glucose: even in an elementary treatise the estimations of uric acid, creatinin, and hydrochloric acid in gastric juice should have been included. Newer quantitative micro-chemical methods such as those of Folin and others are not described, and there are no figures of apparatus. Probably the authors hold that these micro-methods do not belong to an elementary work; hence no method is given for estimating the sugar in the blood. Possibly for the same reason there is no reference to the colorimeter, to the polarimeter, or to filtration through a Berkefeld filter. We have found nothing about the chemistry of the faeces or the chemical aspect of respiration. Considerably more might with advantage have been said in the didactic part of the chapter on the physiology of alcohol, and a fuller description given of the chemistry of the washing of the skin—a subject about which the medical student's views are very hazy. No method for the quantitative estimation of protein in urine is given, nor, indeed, of protein anywhere; this omission may be excused on the ground that these subjects belong to pathological chemistry, though in reality only the former does. No directions are given for the preparation of substances in a pure state. We hold with Liebig that nothing in physiological chemistry trains the beginner like having to prepare some of these. The acetone method for urea is so extremely simple that it should have been included in any case. Every laboratory manual for the junior student should contain a simple method for demonstrating the reducing powers of the tissues whether or not "reductase" is believed in on theoretical grounds. There are one or two minor inelegancies, such as "Points in Pavy," and "a new lot of Pavy." Probably "Fehling solution" for "Fehling's solution" is an oversight; but "crystallized" has still two l's; on page 114 it is given only one. The blank leaf between every two printed pages is an excellent feature of the book, and there is an index.

[3] *Elementary Practical Biochemistry.* By W. A. Osborne and W. J. Young. Second edition. Melbourne: W. Ramsay. 1924. (Demy 8vo, pp. 151. 12s. 6d. net.)

THE PROLONGATION OF LIFE.

UNDER the title of *Health Building and Life Extension*[4] Dr. E. L. FISK gives a very interesting account of American activities in the prolongation of life and the increase of working capacity. The book is a survey of industrial health conditions made by the Life Extension Institute of New York on behalf of a Committee on the Elimination of Waste in Industry, the committee having been appointed by a federation of engineering societies. Dr. Fisk holds that all forms of disease and physical deficiency can be combated on lines correctly laid down. The problem of fatigue has to be solved at its source, and the committee's study and research had to be extended so as to include not only industrial problems, but health factors affecting mankind in general.

The book is in three parts, entitled respectively "The physical state of civilized man"; "The problem of industrial health and working capacity"; and "Preventive, remedial, and constructive measures." In the first part there is discussion of the question of physical degeneration, the extent of disabling illness, the possibility of further extension of the life cycle, the health cycle, and the work cycle, and the value of periodic examination and health supervision. In a Government report on national vitality in 1909 it was stated that about three million persons were seriously ill at all times in the United States, and that 42 per cent. of this was preventable, with a resulting life extension of more than fifteen years. Since that time certain statistics have indicated that an estimated annual loss of thirteen days per head from illness has been reduced by at least a third, and the expectation of life has been extended by about nine years. In Part II of the volume the effect of many agencies injurious to health is considered, including infections; harmful drugs and beverages, alcohol, and tobacco; food deficiency and excess; foul air; hormone deficiency and excess; physical and psychic strain and apathy; and injuries to sight. This section of the volume concludes with a brief chapter on the economic loss from preventable disease and sub-standard health conditions. Part III is devoted mainly to questions of organization of control measures, by the Federal Government, by individual States of the Union, by communities, and by industries. Voluntary agencies are also dealt with, and the concluding chapter relates to special drives against disease.

It will be seen from this indication of its contents that Dr. Fisk's volume covers a wide field. It is vigorously written and graphically illustrated. To health authorities and health officers in this country it reveals in convenient compass what is being done in the United States. That country admittedly followed the lead of Britain, but in freshness of outlook and initiative it is now in some directions perhaps surpassing its teachers, who in their turn ought to be willing to profit from their pupils.

[4] *Health Building and Life Extension.* By Eugene Lyman Fisk, M.D., Medical Director, Life Extension Institute of New York. New York: The Macmillan Company. 1923. (Cr. 8vo, pp. xvi + 521. 16s. net.)

PSYCHOTHERAPY.

THE revised edition of *Psychotherapy*[5] by Dr. JAMES J. WALSH contains four entirely new chapters and some other material. It is a massive work containing an enormous amount of information, historical and other. In a sense the book may be described as "old-fashioned"; the author makes the briefest references to psycho-analysis, he does not mention the various mental mechanisms, and makes no attempt to discuss psychopathology as it is now commonly understood. For Dr. Walsh psychotherapy means suggestion in the broadest sense of the word; and his teaching is designed to show the importance of this process in the treatment of all forms of disease, both functional and organic. His outlook is perhaps best expressed in his quotation of Mandeville (fourteenth century) from Avicenna, the Arab Galen of the eleventh century, who owed it to the ancient Greeks: "Often the confidence of the patient in his physician does more for the cure of his disease than all the physician's remedies." This quotation is printed on the title page and its spirit permeates the whole of the author's teaching. He holds no exaggerated notions as to the possibilities of cure by suggestion in organic diseases, but he is no doubt correct in his opinion that all disease is favourably influenced, or at least its pains alleviated, by an attitude of faith and hope on the part of the patient.

This book approximates to being a textbook of medicine because its author, in accordance with his aims, deals exhaustively with psychotherapeutic procedures in disorders of the digestive tract, cardiac disease, respiratory diseases, affections of the joints and muscles, gynaecological disorders, genito-urinary and skin diseases, and organic

[5] *Psychotherapy: Suggestion in the Treatment of Disease, with the Principles for the Employment of Energies Derived from the Mind for the Relief of Functional Ailments.* By James J. Walsh, M.D., Ph.D., Sc.D. Revised edition. New York and London: D. Appleton and Company. 1923. (Med. 8vo, pp. xxix + 846; 45 figures. 30s. net.)

nervous conditions, as well as the functional nervous disorders. There is a great deal in the book which should recommend it to the medical practitioner; it is true that much which is now regarded as so essential for the effective treatment of nervous disorders is omitted, but at the same time a great deal of strictly practical advice is given which the family doctor will find very helpful; in some respects it may prove more helpful than some of the more "modern" works, the theories of which the practitioner is apt to find almost incomprehensible. The book would perhaps have been more useful to the busy doctor if it had been considerably contracted, but the historical survey given by Dr. Walsh is certainly interesting.

SURGICAL OPERATIONS.

THE fourth edition of *The Student's Handbook of Surgical Operations*,[6] by Treves and Hutchinson, makes a very welcome appearance. Although its new lease of life rests entirely in the hands of Mr. JONATHAN HUTCHINSON, it revives the memory of the distinguished author of the first edition. Of its kind this book is a classic, a model of concise and literary description of operative procedure. The increase in size is about forty pages, and the number of illustrations has grown to 167. New operations are substituted and those considered obsolete are discarded. For instance, partial gastrectomy, operations for congenital pyloric stenosis, displaced semilunar cartilages, meningeal haemorrhage, fractured patella, are now fully described, whereas Chopart's and Pirogoff's amputations pass into oblivion. We could wish Mr. Hutchinson had applied the axe with a heavier hand to this chapter. Although the "classical" operations must of necessity exercise the mind of the student at examinations for want of better material, it seems that this section is too laboured with alternative methods. The average student sees comparatively few of these operations in hospital, and their description certainly could be simplified in view of the experience gained during the war. Nevertheless, Mr. Hutchinson has moved in the right direction, and we feel sure the popularity of this excellent handbook will be further enhanced.

NOTES ON BOOKS.

WE have received copies of two publications dealing with income tax. In his little volume[7] Mr. RONALD STAPLES, who pleads guilty to holding an official position in the department responsible for income tax administration, has addressed himself to the task of putting into brief and clear form sufficient explanation of the working of the system to enable the average taxpayer to surmount the difficulties of rendering returns, checking the claims made on his pocket, and getting back from the State what is due to him. The little book is not without blemishes; for instance, the method of computing repayments shown in the useful chapter entitled "How to secure repayment" is obsolete and apt to mislead, and we differ from him in thinking that the chapter on inhabited house duty justifies its inclusion in spite of the recent repeal of that tax. It is, however, clearly set out, and should be found very useful by the class of person for whom it was written. OLIVER and BOYD'S *Tabular View*[8] is, in the main, a statistical chart, setting out such details as the rates of income tax from 1842 onwards, the money value of various totals of allowances, etc., but contains also a useful section setting out the various allowances and the conditions attaching to them, and gives illustrations showing the rules in operation. It is a triumph of ingenious condensation, but has the unavoidable defects of that quality: it is not "readable," and covers the normal rather than the unusual case.

The novel entitled *Dr. Porteous*[9] is a posthumous work by the late Dr. ARTHUR BREBNER, the author of two other well written stories, *The Shadows of the Ship* and *Patches and Pomander*, who died of tuberculosis aggravated by war service a few years ago. It is a record of the struggles of a young doctor in an uncongenial profession subsequently changed for that of an artist in which the future promises to be brighter.

[6] *The Student's Handbook of Surgical Operations.* By the late Sir Frederick Treves, Bt., G.C.V.O., C.B., LL.D., F.R.C.S., and Jonathan Hutchinson, F.R.C.S. Fourth edition, enlarged. London and New York: Cassell and Co., Ltd. 1924. (Cr. 8vo, pp. xi+552; 167 figures. 10s. 6d. net.)

[7] *Income Tax.* By Ronald Staples. Third edition, 1924-25. London: Baillière, Tindall and Cox. 1924. (Cr. 8vo, pp. 125. 2s. 6d. net.)

[8] *Tabular View of Income Tax and Super Tax, 1842-1925.* Seventh edition. Edinburgh: Oliver and Boyd. Price 1s.

[9] *Dr. Porteous.* By Arthur Brebner. London: A. M. Philpot, Ltd. (Cr. 8vo, pp. 260. 7s. 6d. net.)

ROYAL COMMISSION ON LUNACY AND MENTAL DISORDER.

(*Continued from page 864.*)

A FURTHER sitting of the Royal Commission on Lunacy and Mental Disorder was held on November 5th, under the chairmanship of Mr. H. P. MACMILLAN, K.C.

Evidence of Masters of Poor Law Institutions.

Evidence was tendered by Mr. H. SENIOR and Mr. G. USHER on behalf of the National Association of Masters and Matrons of Poor Law Institutions. Their principal contention was that a longer period of detention was desirable than the fourteen days allowed by the Act; the period they suggested was twenty-eight days. This longer period would enable the justice and the doctor to come to a more deliberate decision on the case, and possibly fewer cases would have to be certified. Even as it was, it was found unnecessary to certify quite 50 per cent. of the people who came in under temporary orders. The witnesses also spoke of the unsuitability of small Poor Law institutions in rural districts for the handling of mental cases, owing to the inexperience of the officials, and they contended that in each considerable area there should be one Poor Law institution selected and equipped for the purpose of dealing with these cases. The witnesses also felt that the medical officer should be given power to discharge the patient at any time within the detention period. Cases of permanent detention should be subject to periodical revision by a medical officer in conjunction with a justice of the peace.

The Judicial Authorities.

Mr. L. WHITEMORE, J.P., a judicial authority under the Lunacy Acts for the County of London, gave evidence from his considerable experience in dealing with petitions for reception orders in the case of private patients. He complained of an unnecessary duplication of authorities, and also suggested an intermediate period of observation before a final judgement was pronounced upon any case. He was quite in sympathy with the views already expressed that a longer term for consideration was desirable before final certification either of a private or a Poor Law patient, but if this longer period were granted an additional safeguard should be provided in the shape of an order from the Board of Control.

Colonel P. BROOME GILES, C.B., F.R.C.S., J.P., lately of Buckinghamshire and now of Folkestone, speaking as a judicial authority in lunacy, considered that it should be made obligatory on the magistrate to visit every patient who was the subject of an application for an order. It was true that the justice had the medical certificates to go upon, but he was not doing his duty unless he saw the patient for himself. It had been his own practice not to pay regard to the information contained in any document until after a personal interview. He felt it to be his duty as a magistrate to make up his mind from the facts he discovered for himself. The Chairman pointed out that the witness was in an exceptional position in that he was a qualified doctor as well as a magistrate, and asked what would be the duty of magistrates who had no medical qualification. The witness considered that they must still use their own judgement, but, of course, in dealing with an alleged lunatic the information given on the certificates would be their chief guidance. It had been his practice in some cases, when the patient was brought to him by a relative and he was not sure as to the nature of the case, to adjourn it for fourteen days for further consideration. In reply to a question as to what would happen to the patient in the meantime, the witness said that if the patient's house was sufficiently large he would remain there, nurses being called in, and the man carefully watched; in some cases the workhouse was the only place for such reception, but it was not at all a proper place, and it was the duty of the country to provide houses of reception for such cases. The Chairman said that it was a possible recommendation of the Commission that there should be places for the treatment of non-certified cases, but he thought it inevitable that the patient should be subject to some degree of control or compulsory detention during that interval.

The witness was next questioned on his experience as a member of visiting committees, and was asked whether the visits gave patients in institutions a satisfactory opportunity of access to the outside world. The witness replied that many complaints were made to visitors, but few of them proved on inquiry to be of a tangible nature. No difficulty, in his experience, was put in the way of a patient interviewing the visiting magistrate. He had given private interviews to lunatics in some cases in a locked room, no other person being present. Asked whether this was not rather a dangerous proceeding in view of any possible homicidal tendency on the part of the patient, the witness replied that in doing one's duty certain risks must be taken, and personally, having won the middle-weight gloves in his earlier days, he had no fear. One case of ill treatment had been brought to his knowledge by the

medical officer and the attendant dismissed; in another case the complaint was brought by the patient and sustained, and a negligent attendant was dealt with.

In reply to further questions, he said that in his conversations with alleged lunatics preliminary to an order he was careful never to disclose the fact that he was a judicial authority. Earl Russell asked whether this was quite fair to the patient, who, finding a stranger appearing in the character of a friend, would never know when he had to fight an order. The intention of the Act was that the justice should represent the public, and that the patient should thus be given a chance of making his protest. The witness replied that persons in this state were very impressionable, and the knowledge on their part that he was there as a magistrate with a view to their detention would upset them to such a degree as to make it impossible for him to arrive at their true condition. Lord Eustace Percy asked to what extent a magistrate could be a check on the medical authority. The witness replied that the magistrate had got the Act to administer, and if he found nothing contrary to what the medical men had certified he was obliged to sign the order. He added that he had only known one magistrate who went against medical opinion, and he was one of that class of men who ought not to be magistrates. This magistrate refused to certify a lunatic, and within two hours the lunatic had seriously injured his wife and committed suicide. The witness did not think that any magistrate would go against medical opinion, but it was very necessary that the magistrate should personally verify, as far as possible, the facts stated on the certificate. He himself always took steps to verify those statements on the certificate which were put down by the medical man as not having been observed by him but as having been obtained by hearsay evidence. He thought that the verification of such information ought to be made obligatory on the justice. He said, in reply to Sir Humphry Rolleston, that he had not found during recent months any particular indisposition on the part of private medical men to sign certificates.

FUTURE OF MEDICINE AND HYGIENE IN THE TROPICS.*

Dr. ANDREW BALFOUR'S ADDRESS.

The inaugural address at the opening of the Anderson College of Medicine in Glasgow was delivered by Dr. Andrew Balfour, Director of the London School of Hygiene and Tropical Medicine. The title of the address was "Vistas and Visions: Some Aspects of the Colonial Medical Services." In it he drew a sketch of our present knowledge of tropical pathology, and endeavoured to awaken in his hearers a realization of the fact that for those of our somewhat overcrowded profession who are keenly interested in pathological research the tropics still furnish innumerable problems calling for solution.

Dr. Balfour continued: Owing to the remarkable advances that have been made in our knowledge of tropical diseases in recent years, there exists, perhaps, a tendency to regard this field of inquiry as having been worked out and, consequently, as lacking in interest. The reverse is the fact. The discoveries already made have opened up new problems, and lacunae in our knowledge retard in many ways their fruitful application. Until comparatively recent times the coastal belt from the Gambia to the Niger bore an evil reputation as the white man's grave; through the work of Manson and Ross that region has been transformed, and it might be supposed that we have little more to learn with regard to malaria. Laveran discovered its cause, Ross and others showed how the infection is conveyed, and the Countess of Cinchon many years ago introduced its specific cure. Yet thirteen years ago Professor Stephens of the Liverpool School of Tropical Medicine called attention to the following points on which our knowledge was defective: (1) the presence of bodies of uncertain significance in the salivary glands of anophelines; (2) the alleged transmission of malarial infection through the eggs of the mosquito; (3) conditions determining the successful infection of anophelines fed on infected blood; (4) the number of persons that one anopheline can infect; (5) the variation in the percentage of infected anophelines from month to month, and its extent; (6) the duration of infection in an anopheline, once infected; (7) the penetration of the red cell by sporozoites; (8) the properties of the salivary secretion of mosquitos. Some of these problems have been solved. Bruce Mayne has shown that one anopheline can infect as many as five persons; Wright has worked at the functions of the oesophageal diverticula, the contents of which mingle with the saliva; and Yorke and Macfie have carried out researches on the salivary secretion itself, and have found that it does not contain a haemolysin. As to the remaining questions, our knowledge is still defective, although Sinton seems to have confirmed Rowley Lawson's view that the sporozoites do not enter the red cells, but adhere externally to their envelopes.

Again, yellow fever is a disease concerning which much has been learnt in recent years. The Americans have solved the problem of its conveyance, Noguchi has discovered its virus, the *Leptospira icteroides*, and a preventive vaccine and curative serum have been prepared. Yet we have still much to learn regarding this deadly malady on the African West Coast. We do not certainly know whether it is the same disease that once ravaged the ports of South America, the West Indies, Bermuda, and the eastern seaboard of the United States. Dr. Carter of the United States Public Health Service is of opinion that it is of African origin, but the leptospira has not yet been demonstrated in West Coast cases. Moreover, we do not know if more than one species of stegomyia or aëdes acts as its vector in Africa, we are not sure if any of the lower animals serve as reservoirs for the parasite, and we have great difficulty in distinguishing the malady from Weil's disease, the spirochaetosis icterohaemorrhagica, which not long ago played havoc in a Scottish coal mine. Recently a discovery has been made by Hoffmann of Havana which, if confirmed, is of importance. He has demonstrated the presence of lime casts in the kidneys of patients who have died from yellow fever; their occurrence is, apparently, pathognomonic and will serve to distinguish yellow fever, *post mortem*, from other febrile maladies associated with jaundice.

To take another instance—bubonic plague. This disease is at the present moment taking toll of human life on the Gold Coast, in Ashanti, and in Nigeria. Its pathology has been fully worked out, the role of the rat and of other rodents has been established, the flea has been incriminated, and there is a plague vaccine and plague serum. What further knowledge can be required? Yet plague persists; it slays millions in India, and the rat, its carrier, defies our efforts to cope with him; plague serum is too often a broken reed and our drugs are usually powerless. Rodier's method of killing all female rats caught and letting loose the males—a plan that has been successful in the case of Australian rabbits, and used to good effect against rats in some limited areas—has been tried; we have attempted to interfere with the animal's family life, its fertility and fecundity, and, generally speaking, we have failed. We are only beginning to realize the importance of certain factors; French observers have drawn attention to the possible presence of healthy human and healthy rat carriers of the disease. It is obvious, therefore, that in the group of British colonies referred to, and considering only three of the diseases met with in them, there is plenty to engage the attention of a keen and trained observer; and it may be assumed with tolerable certainty that other diseases remain to be discovered—diseases which at present are mistaken for disorders with which we are more or less familiar and which have to be separated and worked out.

To turn to another region—the Sudan. Although the Sudan Medical Service is not under the Colonial Office, the Anglo-Egyptian Sudan possesses a Government service well worth the attention of the young medical graduate. It is many years since Sir William Leishman, a Glasgow man, discovered the protozoal parasite of the tropical malady, which is found in certain parts of the Sudan, called, after him, leishmaniasis, and by the Indians kala-azar or black fever. We are still ignorant how the parasite effects a lodgement in the human body. There is a fine field for work in this direction, although we may conjecture that it is about to be explored with considerable thoroughness by Colonel Megaw and his companions from the Calcutta School of Tropical Medicine. There is, moreover, a new disease existing in the Northern Sudan which requires particular attention. It is associated with the

* Abstract of inaugural address at the opening of the winter session of the Anderson College of Medicine, Glasgow, October 14th, 1924.

presence of a peculiar bacillus which Dr. Andrew Balfour found in the throat and mouth of a British officer in Khartoum, producing ulceration and exercising a markedly depressant effect on the heart. Owing to loss of the culture through no fault of his own, Dr. Balfour was unable to pursue the study of the organism, but it has since been rediscovered by a Canadian medical officer while investigating an outbreak of sore throat among British troops in Khartoum. With regard to sleeping sickness, which is a well known malady in Southern Sudan, although we know the trypanosomes which cause it and the tsetse flies which act as their intermediate hosts, and can cure many cases by atoxyl, antimony, Bayer 205, or tryparsamide, we are very far from having exhausted the subject of the old negro lethargy. We are not yet certain whether *Trypanosoma gambiense* and *T. rhodesiense* are one and the same parasite or different species; we still dispute over the question of wild animals as reservoirs of infection; we are uncertain as to the feeding habits of glossinae, and are still seeking for the best drug to use in the treatment of the disease.

Nor in the adjoining territory of Uganda is there any lack of medical problems. Plague, malaria, and sleeping sickness are rife in the protectorate, and cerebro-spinal meningitis continues to take toll of the natives. Syphilis is one of the curses of the country, and despite all that has been accomplished in working out its etiology and pathology, there is still much to be discovered, especially in relation to its ravages among the natives and the life-history of the parasite. Another spirochaetal disease prevalent in Uganda is tick fever, and it may be said with regard to spirochaetal diseases generally that we are still in the dark as to the morphology and development of the organisms that cause them. In Kenya plague again presents its problems, and in addition there occur there a strange complaint simulating pneumonic plague, and a malady recalling typhus fever, but apparently not louse-borne, both of which require elucidation; in this region there is also the important and deeply interesting question of the acclimatization of the white settlers in the highlands. The Germans have worked hard in Tanganyika Territory, but have by no means exhausted its possibilities for the British student as a field for inquiry. There is leprosy, for example—we remain ignorant of its mode of spread, despite theory after theory; and tuberculosis, too common in the coastal towns; it would be very far from the mark to suppose that tuberculosis is a completed chapter in pathology and therapeutics, especially if regarded from the tropical standpoint. Dysentery is also common in both forms in Tanganyika, and far from the war having taught us all we need to know about that disease, it served rather to show us how ignorant we are on the subject. So far as bacillary dysentery is concerned there are undoubtedly facts to be unearthed regarding its relation to flies. In some places there is very little dysentery when flies swarm; the infection is there but the flies do not seem to act as carriers. Nor can it be affirmed that we have reached finality in the treatment of chronic amoebic dysentery, and the man who discovers a cure for that disease will earn the gratitude of many a hapless sufferer.

Rhodesia, the youngest of Crown colonies, presents new subjects for inquiry. At the present moment Northern Rhodesia is disturbed by the occurrence of cases of splenic abscesses among the natives, the etiology of which so far remains obscure, and in Southern Rhodesia blackwater fever is attracting much attention. Even if we admit that the latter is intimately bound up with malaria, we have yet to learn the precise relationship and how really bad cases can be saved. There is, it may be said, little finality in tropical medicine. We thought we knew all there was to know about undulant fever, since Bruce, a great Scottish worker, isolated the *Micrococcus melitensis* and the commission under his guidance incriminated goat's milk. Yet it was but yesterday that Bevan, in Southern Rhodesia, gave us the first inkling of a link between the organism of Malta fever and that of the contagious abortion of cattle, the *Bacillus abortus* of Bang.

Again, consider Mauritius, that continent in miniature, the finest and smallest of British colonies. Its diseases furnish food for thought apart from those already mentioned. Why is it that yaws does not occur there? The disease is first cousin to syphilis, and yet it is not a venereal complaint. It has undoubtedly been introduced into Mauritius, but it has not spread. Why has cholera, the water-borne disease *par excellence*, which has played such havoc in the island on several occasions, disappeared from it entirely, although to all appearance there was everything in favour of its continuance and extension? Why has the chigger flea, which burrows into the skin of the feet, never gained a footing in the colony? In Ceylon we may ask ourselves how we stand with regard to sprue, that malady of frothy stools, sore mouth, emaciation, and anaemia, which hurries many a tropical sojourner to the grave. If Scott is right—and there is good reason to credit his findings as regards calcium metabolism and the control of the parathyroids—one puzzle will have been solved, but even so there are points about sprue that will still require investigation. The hookworm also causes much mischief in Ceylon, and although, thanks to the Rockefeller workers and others, it has been tracked and can be treated, we have yet to learn definitely the nature and action of its toxin.

Passing on to Singapore and the Malay States, we greet a worthy son of Glasgow, Sir Malcolm Watson, a household name in Malaya, whose energy, pertinacity, and enthusiasm in antimalarial work have saved many thousands of lives. Malaya has a fine record of research and the practical application of results, but if we take beri-beri as an instance it is safe to affirm that we have not heard the last about that disease, either there or elsewhere. It is possible that more than one disease masquerades under that name. Diet deficiency, the lack of antineuritic vitamin, will explain much, but it is doubtful if it will explain all. There may be a toxic factor, at present merely suspected and remaining for definite elucidation. Malaya well exemplifies our opportunities, for it was only recently that Stanton and Fletcher determined the cause and worked out the pathology of what they called melioidosis, formerly described by Whitmore as morphine injector's disease.

It is possible that there are no more fruitful fields of research than are to be found in Borneo and New Guinea. Passing these over, however, we find the South Sea Islands presenting many problems of pathological interest. There we are faced by the mysteries of filariasis. Bancroft and Manson first shed light on the life-history of the blood-worm, and Low completed the tale. That is an old story, yet the disease remains incurable, save where the surgeon's knife can give relief. In Fiji we have yet to learn why the island is practically immune from syphilis, and how best to prevent the extinction of a fine race, decaying under the influence of a civilization that is alien to its sentiments. There is work to be done in those islands, and although Dr. Buxton has it well in hand at the present time we may be very sure he will leave something for his successors to accomplish. Filariasis will be met with again in Demarara, but, in addition, epidemics of dengue will from time to time occupy the attention. Dengue, dandy, or breakbone fever is one of those partly explored diseases as to the cause of which we are still somewhat uncertain, although there seems little doubt that a blood spirochaete is to blame, as is the case with the very similar sand-fly or phlebotomus fever common in Palestine and Mesopotamia. Do we know the cause of pellagra, which will be met with in the Leeward and Windward Islands? Though there is little doubt of its being a dietetic disease, we are not yet certain of its precise etiology, notwithstanding the valuable work of Goldberger. Can we say why Barbados is free from anopheline mosquitos? Is it wholly attributable to the presence of the tiny larvivorous millions fish? It seems doubtful. Why is Bermuda free from anophelines? What do we know about the peculiar form of peripheral neuritis met with in Jamaica? Very little indeed. And so it is wherever we cast our eyes—everywhere a burden of disease, everywhere work to be done. So far from the interest in tropical research having been exhausted, it may be truly asserted that the earth is literally encircled with unsolved problems awaiting their solution at the hands of the younger scientists of our generation.

British Medical Journal.

SATURDAY, NOVEMBER 15TH, 1924.

MEDICINE A SCIENCE.

When Boerhaave (1668-1738) called Sydenham (1624-1689) the British Hippocrates he intended not a mere general compliment but a discriminating judgement. He meant that Sydenham had revived and sympathetically employed the methods of the Father of Medicine. Nor is it a mere compliment to call Hippocrates by that title. Doubtless in its primitive beginnings medicine was an art with magic for its sister, but since Hippocrates it has been a science with its own methods, and as the Regius Professor of Medicine at Oxford pointed out in his Harveian Oration (British Medical Journal, October 25th, p. 747) it is the mother of the sciences.

Ever since the renaissance of learning there has been an indisposition frankly to admit that medicine is a science of itself. At the time of Sydenham, as Sir George Newman has well said, the equipment of the medical man was classical; he was drilled in the traditions of Aristotle, the aphorisms of Hippocrates, the doctrines of Galen, and the canon of Avicenna; but of systematic clinical observation and instruction there was none. The only direct contact with nature in the curriculum was, for the majority, through botany, for the few through anatomy also, and for fewer still through physiology. Harvey, not being satisfied that medicine should confine itself to observation and the method of trial and error in the human patient, insisted on the need for seeking out the secrets of nature by way of experiment. By so doing he founded physiology, but not many in his own or the succeeding generation understood.

On the other hand, there has been, since the middle of the nineteenth century, a disposition to deny autonomy to medicine for other, and it might also be said converse, reasons. It has had to endure the allegation that it is not a science of itself, but is no more than an art dependent for its advance on other sciences—on chemistry, and on biology, including bacteriology and parasitology, but especially on physiology, which claims insistently to be an independent science supplying the practice of medicine with facts. Sir Archibald Garrod, referring to this matter in the Harveian Oration, spoke wisely and aptly, but the subject might with advantage be more fully developed by some future orator. The time seems ripe, for we are witnessing a linking up of the laboratory with study at the bedside. While commending the tendency of many young workers imbued with the scientific spirit to elect to follow the path which leads through the laboratory, Sir Archibald Garrod deprecated the disposition which undoubtedly exists among some of them to look down on the clinician, forgetting that clinical medicine can and should be pursued in the scientific spirit; it presents immense fields for scientific research, which must be conducted in accordance with certain special methods peculiar to itself; it is not only the mother of the sciences, but itself one of them.

Sydenham entered on the study of medicine at a time when it was dominated by the authority of the ancients and by speculations founded on various preconceived theories. He went back to the bedside to observe, as Sir Humphry Rolleston puts it, the natural history of disease. Both Dr. Arnold Chaplin in the contribution he makes to our columns this week, and Sir George Newman in the thoughtful and entertaining essay (p. 922) he has published for the tercentenary, ask us to believe that Sydenham's Puritan breeding and upbringing had much to do in determining his attitude towards medicine. It may be so, but it was a time of mental questioning and unrest in politics as well as in science and religion. At any rate, circumstances of heredity and environment had prepared Sydenham's mind to understand and apply the Hippocratic doctrine and method. That he did so to the great advantage of medicine at a critical moment is his great claim to remembrance; we can afford to forget that in his singleness of purpose he did not attempt an integration which is only now being brought about, and that he disregarded the new knowledge Harvey and his successors were rapidly accumulating around him. It detracts from his glory, but it may have been all to the good in the long run.

THE GENERAL PRACTITIONER AND THE MATERNITY SERVICE.

However harassed and long-suffering he may be, the general practitioner is not, as a rule, inarticulate, and has many ways of making his voice heard. It is, therefore, difficult to understand why he has remained apparently oblivious of the storm that is now raging over the shortcomings of the maternity service—a service in which he plays a leading part.

This Journal cannot be blamed for not giving full publicity to the matter: frequent articles and notes have called attention to it. Four weeks ago a leading article announced a joint meeting, at the Royal Society of Medicine, of the Obstetrical and Epidemiological and State Medicine Sections with the Society of Medical Officers of Health, to be held on November 6th to consider the notification of puerperal sepsis and other kindred questions. That article, in our issue of October 18th, contained a special invitation from the Council of the Obstetrical Section to general practitioners to come and express their views; and, in order to make clear the problems for discussion and how those engaged in midwifery practice might be affected, a retrospect was given of the various papers and abstracts that had appeared in our columns. The proceedings of that meeting are fully reported this week at page 900, and attention may be drawn to the fact that, apart from the one speaker announced to present the point of view of the family practitioner—the branch of the profession most concerned—there was no audible response to the invitation. The report of the meeting may serve as a text to urge the immediate need for discussion of the official reports and their recommendations by all Branches of the British Medical Association, so that the views of its members may carry due weight. Only by mature consideration and full discussion will it be possible for the Association to express the views of its members.

Like other Government publications, the report from the Ministry of Health (No. 25) by Dame Janet Campbell, and that of the Departmental Committee of the Scottish Board of Health, are read and studied by those of the general public interested in health matters. These reports have already prompted questions in Parliament to the Minister of Health, and have stimulated conferences such as that reported in

our issue of October 11th (p. 685) in which the public take part, showing that there is now a body of opinion that will press politically for immediate action by the central and local health authorities. Circular 517, issued by the Ministry of Health to local authorities, urging the adoption of measures to reduce the risk in childbearing, is further proof of official movement.

The discussion at last week's joint meeting had its origin in a request from the Ministry of Health for advice from the Obstetrical Section as to what administrative action might be taken to reduce the incidence of puerperal sepsis, and particularly as to the measures that should be taken to lead to its prompt notification. The feeling of the meeting seemed to be that, though notification, to be effective, must include early and suspected cases—for example, those with a temperature of 102° or over, continued for twenty-four hours or accompanied by a rigor—so wide a form of notification is useless at present because of the impossibility of providing facilities for further observation of the patient, for accurate diagnosis of the cause of the fever, and for treatment. It appeared to be felt also that a more thorough survey of the maternity services in the country is needed, particularly in regard to the organization of specialist services and better hospital provision. On this account the setting up of a Royal Commission or other method of exhaustive inquiry was strongly advocated. Though the discussion may have had little in the way of definite result, it revealed the difficulties with which the question bristles, and the opportunity may be taken to remind the profession as a whole of the various proposals put forward in official reports and elsewhere, all of which need careful consideration.

Besides a more thorough system of notification of puerperal fever, investigation by the local health authority of all deaths in childbed or deaths within four weeks of the termination of a pregnancy is proposed in the Scottish report, and to aid in this it is suggested that there be added to the birth notification form a line giving the name of the person present at the birth and responsible for the delivery (whether doctor, midwife, or nurse). In some of the conferences on the subject it has been urged also that power should be obtained to conduct *post-mortem* examinations on all deaths in childbed. As will be seen from our report of the meeting at the Royal Society of Medicine, Dr. Flemming, who presented the general practitioner's point of view, made clear the importance of deciding whether the powers of investigation into childbed deaths should be in the hands of the larger or the smaller health authorities. These investigations and the organization of public assistance should surely be reserved to county councils and the councils of county boroughs, and not delegated to the smaller sanitary authorities, as has been done in the case of the Maternity and Child Welfare Act. The less parochialism and the wider the outlook upon the provision for maternity services, the more efficient are these services likely to be. As to the method of reviewing the present state of the maternity service, and of deciding where amendment is needed and how it can best be effected, there are many advantages in the appointment of a Royal Commission rather than the cheaper and less effective Departmental Committee. With its powers of printing evidence, and not merely a report and recommendations, a Royal Commission offers greater opportunities for arriving at agreed decisions and securing the goodwill of all concerned.

Our object in returning to this subject will be attained if it helps to arouse the general practitioners of the country to a realization of the necessity for immediate consideration of all aspects of the problem of the reduction of maternal mortality in childbed. Their case must not be allowed to go by default. To wait until public opinion has so far crystallized into administrative action that it has become difficult to mould would be most unfortunate, alike for the general practitioners and for the public health. Their co-operation must be an integral part of all schemes for the betterment of the maternity service. Provided discussion is carried on from the wide viewpoint of the public good, and not from the narrow one of professional interest, the reasoned opinion of those who have hitherto borne the burden of the maternity service is the most essential element in bringing about wise amendment.

THE NEW MINISTER OF HEALTH.

Last week we urged the importance to the nation of the appointment at the present juncture of a strong Minister of Health, and by the time our plea was published the announcement had been made that Mr. Baldwin's choice had fallen on Mr. Neville Chamberlain. That selection exactly meets the case. We believe that Mr. Chamberlain's brief tenure of the same office in 1923 impressed the staff at Whitehall with his high qualifications as their chief, and his work on housing commended him to the country generally. One fact which has been divulged regarding his appointment possesses a special significance. He was offered the higher post of Chancellor of the Exchequer, but declined it in favour of the Health Ministry. A man who can make a sacrifice like that for an ideal will go far in the sphere he has deliberately chosen. He appreciates its possibilities, and will surely turn the possibilities into actualities. The safety and security of the kingdom largely depend on the solution of the housing problem. That, evidently, is the first task to which Mr. Neville Chamberlain will apply himself, and his success should go far towards establishing peace and contentment throughout the land. But also, as indicated last week, we trust he will find time to tackle and reform the whole system of local government in England. Constructive statesmanship in these two directions would give him a great place in the history of our times.

THE METHOD OF PRESENTING SCIENTIFIC COMMUNICATIONS.

The enormous growth of modern scientific literature is, no doubt, alarming—eight journals, for example, now regularly appear on the subject of cancer research alone—and the scientific student will soon have to develop a protective mechanism against the multiplicity of papers with which he is supposed to keep pace. We are not sure, however, that the method suggested by Dr. J. A. Murray in his recent presidential address to the Pathological Section of the Royal Society of Medicine quite meets the situation. Dr. Murray traces the traditional form of the scientific paper to the thesis required in Continental universities of candidates for doctorates in medicine and science. All such theses contain long verbal descriptions, including a laborious summary of existing literature, and it has been taken for granted, even in this country, that that is the proper form for a scientific communication, even though it takes up a great amount of printed space and makes heavy demands on the time of the reader. Dr. Murray also said, quite truly, that the art of writing good narrative is one which few people acquire, and that in scientific work in particular—say, the description of histopathological experiments—it is hardly to be expected. Meanwhile the verbiage grows apace. Dr. Murray's solu-

tion is to fall back frankly upon a pictorial method of presentation. After all, our written or printed characters have been developed from the primitive picture-writing, although to-day they appeal to the eye only by association through the medium of the memory for sounds. In some respects already the pictorial method of presentation has been adopted, as witness the kinematograph, which, with a minimum of words or no description at all, can convey the details of a scientific process. A number of medical or scientific films have been produced; but this method, of course, is far too laborious for the man who has new work to communicate. Dr. Murray's idea is to use photographs, sketches, diagrams, and symbols, liberally interspersed in the minimum of text. He thinks it possible to convey in a rough sketch some details which would require a page or more of written description. To illustrate his contention he "read" a paper through the epidiascope on some experiments in mouse cancer. The paper ran to about half a dozen clichés, with various drawings, diagrammatic conventions, and a few necessary words on each. Perhaps it is a little unfair to say that, although protesting against the use of many words, he spent half an hour of excellent talk in developing his idea, and a further half-hour of equally excellent talk in explaining his sketches. We imagine that, block illustrations being more costly than type, the widespread adoption of a pictorial method would be a serious matter for the publisher, and we are not sure that it would even attain the end in view, for words, cumbersome as they are, have a certain precision, whereas pictures may lend themselves to a variety of interpretation, and thus obscure rather than elucidate the theme. If scientific writers cannot master the art of brevity, the only hope appears to lie in the development by the scientific public of a capacity for rapid assessment and discrimination.

CONGRESS OF OBSTETRICS AND GYNAECOLOGY.

The fifth Congress of Obstetrics and Gynaecology will be held in London, at the house of the Royal Society of Medicine, from April 22nd to 24th, 1925. The first congress was held in London in 1920; subsequent congresses met in Birmingham, Liverpool, and Edinburgh. The purpose of the congress is to bring together members of the various British and Irish societies devoted to the subjects of gynaecology and obstetrics. It includes the Section of Obstetrics and Gynaecology of the Royal Society of Medicine, the Midland Obstetrical and Gynaecological Society, the North of England Obstetrical and Gynaecological Society, the Edinburgh Obstetrical Society, and the Section of Obstetrics and Gynaecology of the Royal Academy of Medicine in Ireland. Dr. H. Russell Andrews will preside over the congress next year in his capacity as President of the Section of Obstetrics and Gynaecology of the Royal Society of Medicine. The programme of business will include a set discussion on the diagnosis and treatment of puerperal sepsis, which is expected to occupy one whole day of two sessions. This discussion will be introduced by a report upon which a special London committee has been working for more than a year already, and another report is expected from the North of England. Other sessions will be allotted to the reading of individual communications and to epidiascopic demonstrations on histological subjects, and a preliminary report on eclampsia will be communicated by the Special Eclampsia Committee. Operative demonstrations will also be given at the various hospitals by their gynaecological surgeons, and an exhibition of pathological specimens will be arranged. Notice of intention to read papers should reach the honorary secretaries, Dr. Clifford White, 62, Harley Street, W.1, and Dr. J. D. Barris, 50, Welbeck Street, W.1, before December 31st, and the papers should be in their hands by February 28th, 1925. It is hoped to publish in advance a short extract of each paper accepted by the congress committee. Communications respecting papers should be addressed to the honorary secretaries of the congress, and those relating to the exhibition of specimens to the honorary secretary of the Pathology Subcommittee, Dr. Everard Williams, 5, Wimpole Street, W.1. The London members of the congress will entertain the visiting members at lunch on April 22nd, and the President will hold a reception in the rooms of the Royal Society of Medicine the same evening. On April 23rd the members of the congress and their guests will dine together.

INTELLECT AND POSTURE.

Dr. W. Colin Mackenzie, well known to orthopaedic surgeons as the author of a treatise on the action of muscles, has issued a neatly printed booklet to support a bold and somewhat novel thesis.[1] He believes that "the impetus in development from the reptile to the highest mammal is improvement in muscle function, culminating in the erect posture." In another passage he amplifies his meaning by the following comparison: "If we examine anatomically the body of the lowest mammal (echidna) with that of the highest mammal (man), we find little difference between them. The general structure scheme, in spite of the millions of years intervening, is the same. We have in both a four-chambered heart, complete respiratory piston or diaphragm, big spleen, lungs similar and confined to the chest, and the grey matter of the richly convoluted brain of both is external and not the white as in the reptile's brain. Furthermore, if we examine the organs microscopically we find the same structures as in man." "What, then," asks Dr. Mackenzie, "constitutes the great difference?" His answer is: "The great difference between the lowly echidna and us is actually a muscular one. We have the erect posture and it has not. And that is really what is meant by higher mammalian evolution." For Dr. Mackenzie "posture maketh the man"; if we can explain how he has come by his posture, then we shall have solved the origin of his brain and body. This is a thesis which will require much fuller proof than Dr. Mackenzie has succeeded in bringing forward in his present work. On the other hand, everyone must feel a real sympathy for the object which has prompted Dr. Mackenzie to write this book. When he returned to Australia at the end of the war he resolved to devote his life and resources to the study and preservation of the "living fossils" of his native land—platypus, echidna, and the many forms of marsupials—all of which are threatened with a speedy extinction. He has set up an institution to carry out his aims, and the proceeds of this book are to be devoted to it. He reminds his readers that John Hunter was the first anatomist to study the archaic mammals of Australia, and he proposes to follow Hunter by making function rather than structure the main end of his inquiry. "Our animals," he writes, "are teeming with points of scientific interest. In them the complexities of the human body are revealed in their simpler form. A study of them is really a study of living human embryology—that is, embryos in which we can study not only function on which structure depends, for to the medical scientist the latter must be regarded as the register of the former. It can be truly said that there is not a problem in human anatomy or physiology on which a study of these animals fails to throw light." As far as possible we have allowed Dr. Mackenzie to speak for himself. In the brief space at his disposal in the present work he has been obliged to touch his theme lightly, allowing assertion to serve as evidence, but we expect proofs will be forthcoming in full measure.

[1] *Intellectual Development and the Erect Posture.* By William Colin Mackenzie, M.D., F.R.C.S., Director of the National Museum of Australian Zoology. Melbourne: Allan Grant. 1924. (Demy 8vo, pp. iv + 41; 8 figures.)

THE FUTURE OF THE RÖNTGEN SOCIETY.

Sir Oliver Lodge relinquished the chair of the Röntgen Society on November 4th, and inaugurated his successor, Dr. A. E. Barclay of Manchester. The retiring president had some interesting philosophical observations to make on the subject of incredulity, both scientific and popular. The disbelief of some scientists—not, he thought, the most eminent—in the existence of the ether, the very ripples and vibrations of which lighted their path to knowledge, led him to consider the naturally sceptical habit of the human mind in general. He had known persons who disbelieved in the telephone, and who thought that *x*-ray photographs were in some way faked. Why, indeed, did people ever come to believe in certain things at all? Not because they understood them. Very few things in the universe were understood. The nature of almost everything, including the *x* rays and such forces as gravity and cohesion, was still a closed book. But things were believed simply because they became customary, familiar, and available. Sir Oliver Lodge added that such belief as was possessed required to be constantly fortified by fresh experience. He hinted that even a belief in the positive results of psychical research depended upon continuous discovery; unless fresh evidence was forthcoming, the evidence already gathered tended to evaporate. It was easy to see things one day, but after a time to doubt whether one had seen them. Sir Oliver Lodge looked forward to amazing new conceptions in physics resulting from the discovery—only just missed by Crookes—of the pressure of light. Infinitesimal as this pressure was, he said that it must be of immense cosmic importance, sweeping the universe of dust and inflating the biggest stars like footballs. Dr. Barclay's presidential address, which followed Sir Oliver's valedictory, ranged nearer home. He traced the history of radiology since the day, nearly thirty years ago, when the British Medical Association appointed a special commissioner to investigate "the application of the new photography to medicine and surgery," and dwelt especially upon the growth, separations, and fusions of radiological societies. Looking through the *Transactions* of the Röntgen Society during recent years he gained an impression that, taken as a whole, the proceedings had tended more and more towards pure physics, sometimes scarcely coming within the scope of the society's work as originally outlined. In view of the fact that out of the society's membership of 370 fully half were medical men, it did not appear that a proper balance between medicine and physics was maintained. Incidentally he found it interesting to note the contrast between the physical papers of the early years and those of the present day. Whereas the old papers seldom contained formulae, to-day formulae were so much to the fore as to suggest that to physicists they had become a dialect. Medical members, who did not know the dialect, were made to feel very illiterate, although, to be sure, a medical man had no right to criticize these things in view of the ancient convention whereby prescriptions were still written in Latin. But was the society bringing its medical members into touch with the scientists and others on whom there were dependent? Judging by the attendance of medical members at the meetings he feared that it was not, and that it was tending more and more away from the basis laid down by the late Professor Sylvanus Thompson, as reported in the British Medical Journal in 1897, that of focusing the interests, in relation to *x* rays, of medicine, physics, and photography. Physics on the one side and medicine on the other had become so widely separated that very few medical men had been able to keep pace with the advances in physics, while the medical problems were quite out of the beat of the physicist. The true function of the society lay on the borderline between the two, but to keep strictly to that line would mean that while the majority of the medical members were almost out of their depth, the physicists would be bored by the elementary character of the discussions. The establishment of the British Institute of Radiology (which was the subject of an article in the British Medical Journal of November 8th, p. 871) presented, he thought, a solution of the difficulty. This institute, an almost purely medical body, was anxious to join forces with the society. The fusion would enable the society to father the study of radiations in all their applications to medicine and the sciences and arts. He asked whether the society was content to go on as at present, fulfilling a certain limited function to its eminent satisfaction, hugging a bank balance as a sickness insurance policy or possibly as a burial fund for what the Prince of Wales, at the last dinner of the Royal Society of Medicine, called a "learned corpse." Or was it prepared to empower its executive to take whatever steps were necessary, without endangering the society's individual identity, to extend its sphere of usefulness by direct fusion with the institute or by something short of that? Only by some such departure, so far as he could see, was the society likely to fulfil the objects laid down at its foundation in 1897—to promote the study of *x* rays in all its aspects. It is not customary to have any discussion after a presidential address, and therefore it remains to be seen how this proposal will be received.

THE CLIMATE OF THE ZOO.

In our issue of October 18th (p. 714) Dr. N. S. Lucas contributed an article giving notes of a careful series of observations, extending over four years, on the influence of the London climate on captive animals and on man—the animals in the Zoological Gardens in Regent's Park, and the human population in the borough of Marylebone. The effects of weather on health is a subject which has always been of medical and general interest, and has from time to time been dealt with by doctors and meteorologists, sometimes in combination, as in a research carried on by Mitchell and Buchan in Scotland many years ago. The results have not always been commensurate with the labour expended on inquiry, but that is owing to the inherent obscurities of the facts. So many influences operate in producing a given effect that it is particularly difficult to work back from effect to causes and to disentangle and measure the part played by each agency supposed to be involved. In no sphere of investigation is it more important to have an abundance of data on which to base conclusions, and Dr. Lucas is performing a service to science in extending research into the field of comparative biology, by comparing the influence of climate and weather on the mammalians of the Zoological Gardens with that of the human mammalians who make up the population of the area in which the gardens are situated. Manifestly there is one fundamental difference between the two groups. The inhabitants of the Zoo are, for the most part, in a foreign country; the human inhabitants of the borough are at home, in their natural climate and surroundings. In his study of the subject Dr. Lucas has brought together the four years' monthly facts regarding maximum temperature in the shade, mean minimum temperature of the air (not on the grass), atmospheric humidity, rainfall, north-east winds, sunshine, and fogs, in their bearing on monthly deaths from all causes and from pulmonary disease. He finds that the figures of deaths and of atmospheric temperature do not correspond when duly examined, though deaths are fewer in the warm summer months than in the cold winter ones. Rapid changes in temperature from day to day, even a drop of ten degrees in twenty-four hours, seem to have had absolutely no effect on the animals, and he

points out that this is not surprising, seeing that in the semi-tropical parts of the world the daily range of temperature is far greater than here. Leaving out temperature, therefore, he proceeds to consider the influence of rainfall, humidity, and direction of wind. Here, contrasting very opposite conditions which have existed as between February, 1921, and January, 1922, he holds that the data constitute a nearly perfect example of the importance, for health, of a reasonably dry atmosphere. Another contrast, involving factors of wind—north to east—rain, and sunshine, is found between December, 1920, and October, 1922. The differences are adduced to support the argument that rain without cold winds is harmless, and the converse also applies. That conclusion brings to mind the urgent advocacy, by Dr. William Gordon of Exeter, of avoiding localities under the influence of wet winds in selecting sites for the erection of sanatoriums for tuberculosis. Fog has been found a factor of little moment in Regent's Park, there having been only forty-one foggy days in the four years. On the other hand, the value of sunshine is now universally recognized, and is illustrated in respect of the low human and mammalian death rate in the remarkably sunny year 1921, though in November and December Marylebone had an exceptionally high death rate, both from all causes and from pulmonary disease. Dr. Lucas's provisional conclusions are, first, that neither a dry nor a warm moist atmosphere is harmful, but a cold damp atmosphere is most deleterious both to the higher and the lower animals; secondly, that sunshine is beneficial to both, but apparently more lasting in the case of the lower mammals. Though the four years' study must have involved much care and attention, the deductions from the facts are, as Dr. Lucas realizes, only provisional; and the hope may be expressed that he will continue his observations in what, so far as we are aware, is a fresh field of study in comparative biology and pathology.

CANCER AND INFECTION.

A CORRESPONDENT who has given much attention to this aspect of malignant disease writes: The problem of cancer growth has been attacked from many sides during the last quarter of a century, and although the position is still untaken, to use a military metaphor, it is in fact being steadily sapped, and there seems more certainty of its fall to-day than could have been claimed a few years ago. The characteristic habits of the cancer cell have been elucidated, and the history of its parasite-like life has been written. The solution of this part of the problem is in debt chiefly to the embryologists and the cytologists. We know that cells of the soma may become free of the control under which they normally live, and that the essential features of cells so released are a reproductive activity similar to that of germ cells and a power of nourishing themselves without the aid of any coferments such as are necessary for the maintenance of normal somatic tissues. Possessing these qualities the cells of cancer multiply indefinitely and infiltrate. With many details left out, this is the manner of life of the cancer cell; of its birth, however, our knowledge is far from being precise. We do know that it may be born from a somatic cell under the influence of a variety of stimuli. The list of such stimuli is already long: mere mechanical irritation, certain chemical substances (tar, soot, paraffin), *x* rays, and radium. The cells of the epidermis may assume cancerous characters under the influence of any of these stimulants. With regard to cancer of the internal organs, it has been shown by Fibiger that cancer of the stomach may be experimentally produced in rats and in mice by feeding with the *Spiroptera neoplastica*, a nematode which infests the cockroach in its larval stage. None of the stimulants in this list can be the activating agent in internal cancers in the human subject, but the fact that they are efficient agents in the production of the cancer cell is presumptive evidence that a stimulant of analogous sort is responsible for the cancer revolution in the internal organs such as the breast and the bowel. If the proposition is accepted that a stimulant of foreign origin can start the cancer process in epidermis and mucous membrane, it is worth while seeking for evidence of the presence of some foreign stimulating agent in, for example, cancer of the breast. If this be admitted, the first step will be the review of the work of those who have already reported the finding of organisms of a parasitic type in cancerous tumours. The "parasitic theory" of cancer, in the crude form in which it has sometimes been stated, has revolted the orthodox pathologist and parasitologist, the morbid anatomy and the pathology of the disease being so far removed from the reactions of the body to known parasitic infections. The part which stimulation of somatic cells has been shown to play in the initiation of epidermal cancer forces attention anew to the question whether irritation or stimulation by parasitic infections of some sort may not be among the influences capable of transforming the somatic cell into the cancer cell. The list of those who have published the discovery of parasitic organisms in cancerous tumours is long. Among the most prominent are Doyen in France, Sanfelice in Italy, Gaylord in America. In this country Russell, and subsequently Plimmer, alleged the presence of "parasites" on histological evidence. Monsarrat isolated an organism from cancer of the breast, described its life cycle, and demonstrated that it set up proliferative lesions in the guinea-pig and the dog. Ford Robertson described cultures of organisms derived from mouse cancer which he considered protozoan. Leyton isolated from sarcomata a streptothrix which produced sarcoma-like growths in rats; and lastly, Dr. James Young has returned to the attack and related the isolation of organisms belonging to the vegetable kingdom with a peculiar and characteristic life history. Parasitologists have dismissed these many independent reports as cytological errors and contaminations. In view of our present-day knowledge of the relation of stimulation to cancer production, the subject of the possible part played by parasitic invasion deserves an open-minded reconsideration and investigation.

RHEUMATIC FEVER IN THE SERVICES.

AT a meeting of the War Section of the Royal Society of Medicine on November 10th, Surgeon Commander T. B. Shaw, R.N., brought forward some figures showing the incidence of rheumatic fever in the Navy. From 1907 to 1910 the case ratio per 1,000 rose gradually to 8.53, and in the subsequent years, down to 1915, declined to 6.3; then came a gap in the records owing to the war, but in 1921 the figure fell to 2.28 and by 1922 to 1.95. A striking fall was found also in those conditions, including chronic rheumatic affections, which came under the heading of diseases of the organs of locomotion; the case ratio per 1,000 in 1914 was 14.25, in 1915 it was 20.75, and in 1921 it had fallen to 9.32. In the pre-war period the incidence of rheumatic fever was highest on the home station, and lowest on the Mediterranean and the East Indies stations. This might seem to confirm the general belief that rheumatic fever was more prevalent in the British Isles than elsewhere, but the returns for the home station included those for boys' training establishments, which contained a number of subjects specially prone to the disease. Rheumatic fever, from the service point of view, was important chiefly for the heart lesions caused and the final invalidings which resulted. The ratio per 1,000 invalided out for organic disease of the heart during the years of this survey showed no such reduction as appeared in the rheumatic fever incidence, and was more or less a constant figure. Surgeon Commander Shaw thought it important in this connexion to have regard to the incidence of diseases of the teeth,

gums, palate, fauces, and pharynx, where the case ratio per 1,000 in 1915 was 23.3, and in 1921 had fallen to 10.5, a similar decrease to that shown in rheumatic fever. In the Navy increasing attention had been given during the years under review to oral hygiene and dental treatment, and although the causal agent of rheumatic fever had not yet been determined, it seemed likely that oral hygiene played an important part in prevention. Greater attention was also given to environmental conditions; the men were protected as far as possible from damp and from exposure to sudden changes of temperature, and this again might account in part for the decrease in the number of cases of rheumatic fever. In the case of boys particularly every effort should be made to maintain the tonsils in a healthy condition, and affections of the throat should be regarded more seriously than in the past. Youths who complained of growing pains should not be dismissed too lightly; they should at least be excused all drills and exercises and ordered complete rest in bed. Colonel J. C. Kennedy followed with some comparative figures for the Army. Here also there has been a distinct fall in the rheumatic fever incidence. For the period 1908-12 the case ratio per 1,000 was 5.9; in 1913 it was 4.3, and in 1921 it had fallen to 2.1. These were statistics for the whole Army, at home and abroad, but the drop was more striking if the United Kingdom alone were taken. In 1913 the incidence of rheumatic fever per 1,000 in the United Kingdom was 5, and in 1921 it was 1.6. Of the home commands in the latter year London showed the highest incidence (5.4), the Eastern Command was next (2.4), the Southern, Western, Aldershot, Scottish, and Irish Commands ranged from 1.7 to 1, and the Northern Command was 0.8. The bad eminence of London might be put down to the old-fashioned barracks accommodation, and fog might be a contributing factor. Among garrisons abroad the highest incidence in 1921 was on the Rhine and in Silesia (3.6), next came India (3.1), and Egypt and Mesopotamia (1.9). The figure for India was only slightly less than the figure in 1913 (3.8), although in the years 1904-7 rheumatic fever was comparatively rare in the Indian garrison—something like 0.8 per 1,000. The case ratio of tonsillitis had actually increased in the Army from 22 in 1913 to 32 in 1921. Squadron Leader E. W. Craig gave some figures for the Royal Air Force, which showed that the case incidence rate of acute rheumatism in 1921 was 0.9 per 1,000; in 1922 it was 1.1, and in 1923 it was 0.8. Tonsillitis had shown a downward tendency during these years, and so had diseases of the teeth and gums.

TUBERCULOSIS DISPENSARIES IN NEW YORK.

The *Year Book* for 1922 and 1923 of the Association of Tuberculosis Clinics of Greater New York records that in the year 1908, when the association came into being, the population of the city was 4,469,248, and there were 10,157 deaths due to tuberculosis. In 1923 the population had increased to 5,927,617, but the deaths from tuberculosis had dropped to 5,673. Apart from improved conditions of life, the work performed by the Association must be largely credited with this satisfactory achievement. In the period 1908-23 no fewer than 314,210 patients, including 106,268 children, have been advised and treated, 43,455 tuberculous patients were placed in hospitals and sanatoriums, and trained nurses paid 1,193,172 visits. The association at present comprises thirty-one dispensaries, with districts covering the entire city area. Nineteen of these dispensaries are conducted by the Department of Health, nine by hospitals, two as part of a general dispensary service, and one as part of a health centre service. This active and close co-operation between municipal departments and private institutions leads to uniformity of procedure, prevents overlapping, and co-ordinates clinical and research work. Monthly reports are sent by the dispensaries to the association, which, in its turn, sends back to them quarterly statements of the progress of the campaign throughout the city, including a comparative analysis of the dispensary attendances and studies of the current tuberculosis morbidity and mortality. Approximately one-third of all cases of this disease reported annually in New York are treated at the dispensaries, where also supervision is arranged for some thirty thousand relatives of these patients.

RESEARCH DEFENCE SOCIETY.

The ninth annual issue of the *Fight Against Disease*, the publication of the Research Defence Society, contains, under the heading "Old stories re-told," notes of certain physiological discoveries made as the result of animal experiments. The discovery of the lacteals by Asellius in 1662, Sir Charles Bell's experiments on the nervous system at the beginning of the nineteenth century, and Claude Bernard's discovery of the function of the sympathetic nerve in the rabbit's ear, were important achievements on which, subsequently, valuable researches were based. Attention is drawn to the Home Office report published last July, which showed that during the year 14,081 experiments were performed by fifteen investigators in the course of cancer investigations. Nearly 39,000 experiments were performed for public authorities by 139 holders of licences, and twenty-eight research workers performed nearly 48,000 experiments for the preparation and testing of antitoxic serums and vaccines, and for the testing and standardizing of drugs. The annual subscription for membership of the Research Defence Society is 10s.; associate members pay 5s.; undergraduates and students of medicine are eligible for membership on subscription of 2s. 6d. Further information may be obtained from the Secretary, at 11, Chandos Street, Cavendish Square, W.1.

At the anniversary meeting of the Royal Society on December 1st it will be proposed to re-elect Sir Charles Sherrington, G.B.E., M.D., as President, and Sir David Prain, C.M.G., M.B., as treasurer. Among the members proposed to be elected to the Council are Sir Frederick Andrewes, M.D., Dr. H. H. Dale, and Professor J. B. Leathes, M.B. The Copley Medal has been awarded to Sir E. Sharpey-Schafer for his valuable work in physiology and histology, and a Royal Medal to Dr. Dale for his researches in pharmacology and physiology.

After the ceremony at the Cenotaph in Whitehall, on Tuesday, November 11th, Colonel J. W. H. Houghton, Assistant Director of Medical Services, Eastern Command, laid a wreath on the Royal Army Medical Corps memorial in Westminster Abbey.

Dr. Walter E. Elliot, *M.C.*, M.P., has been appointed Parliamentary Under Secretary for Health for Scotland in the new Conservative Ministry. Dr. Elliot held the same office in Mr. Baldwin's last Government.

THE GENERAL ELECTION.

To the list of successful medical candidates at the recent parliamentary general election, published in our issue of last week, the following two names should be added:

Dr. Arthur Vernon Davies, O.B.E., was returned as a Conservative for the Royton Division of Lancaster with a majority of 2,426. Dr. Davies formerly practised at Crompton, Lancs, where he was medical officer of health from 1919 to 1922. On retiring he went to live at Woking, and is chairman of the Woking Central Conservative and Unionist Association.

Dr. Henry Cobden Haslam of Cambridge was returned as a Conservative for the Horncastle Division of Lindsey with a majority of 1,169. He took the degrees of M.A., M.B., B.Ch.Camb. in 1897 and the D.Sc. in 1914.

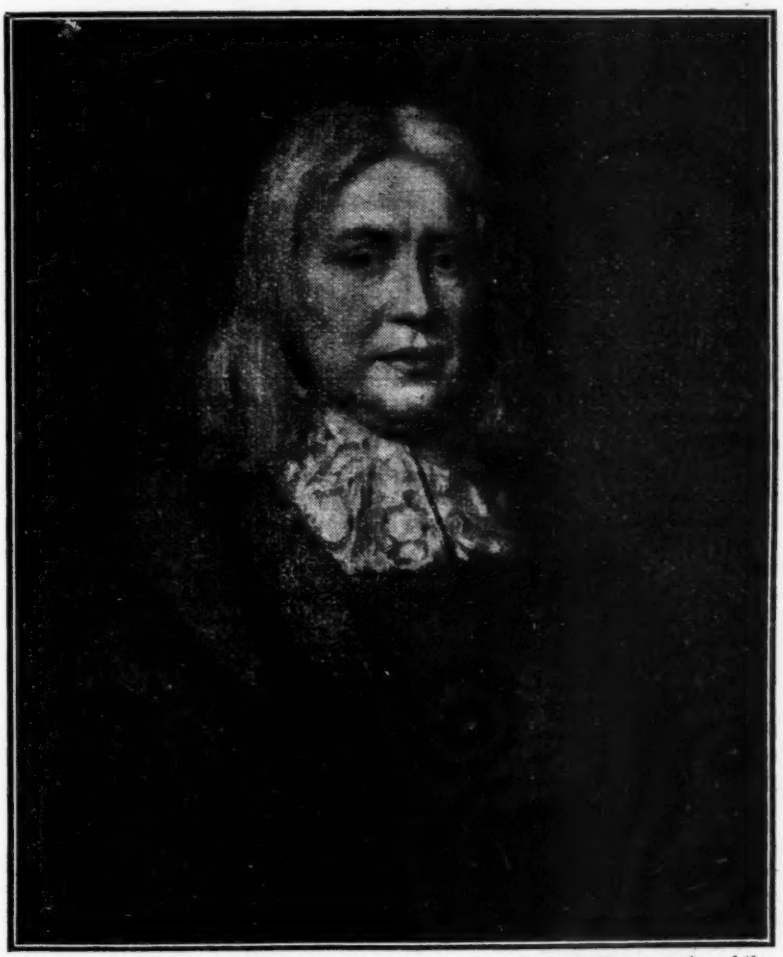
Tercentenary of Thomas Sydenham (1624-1689).

SYDENHAM: FATHER OF CLINICAL MEDICINE IN BRITAIN.*

BY

SIR HUMPHRY ROLLESTON, Bt., K.C.B.,
Hon. D.Sc.Oxon., M.D.,
President of the Royal College of Physicians of London.

Among the great names of this College those of Thomas Linacre, John Caius, William Harvey, and Thomas Sydenham stand out as the apostles and prototypes of the scholar-physicians, of the anatomists, of those who search out and study the secrets of Nature by way of experiment—the physiologists—and of the clinicians, and thus represent important and complementary facets of the ideal physician. Sydenham, the British Hippocrates, following in the footsteps of the Father of Medicine, not only revived but put into practice the dictum that medicine depends on the observation of, not on hypotheses about, disease, and after an interval of twenty centuries he gave a new birth to clinical medicine by concentrating on the study of the patient instead of relying on authority. To books he paid comparatively little heed, it being his "nature to think where others read"; his attention, indeed, was almost confined to the works of Hippocrates, Cicero, Francis Bacon, and to *Don Quixote*, the last of which we can picture him recommending with an inscrutable if not somewhat sarcastic smile in response to that prolific poetaster Richard Blackmore's inquiry as to what medical books he should read.

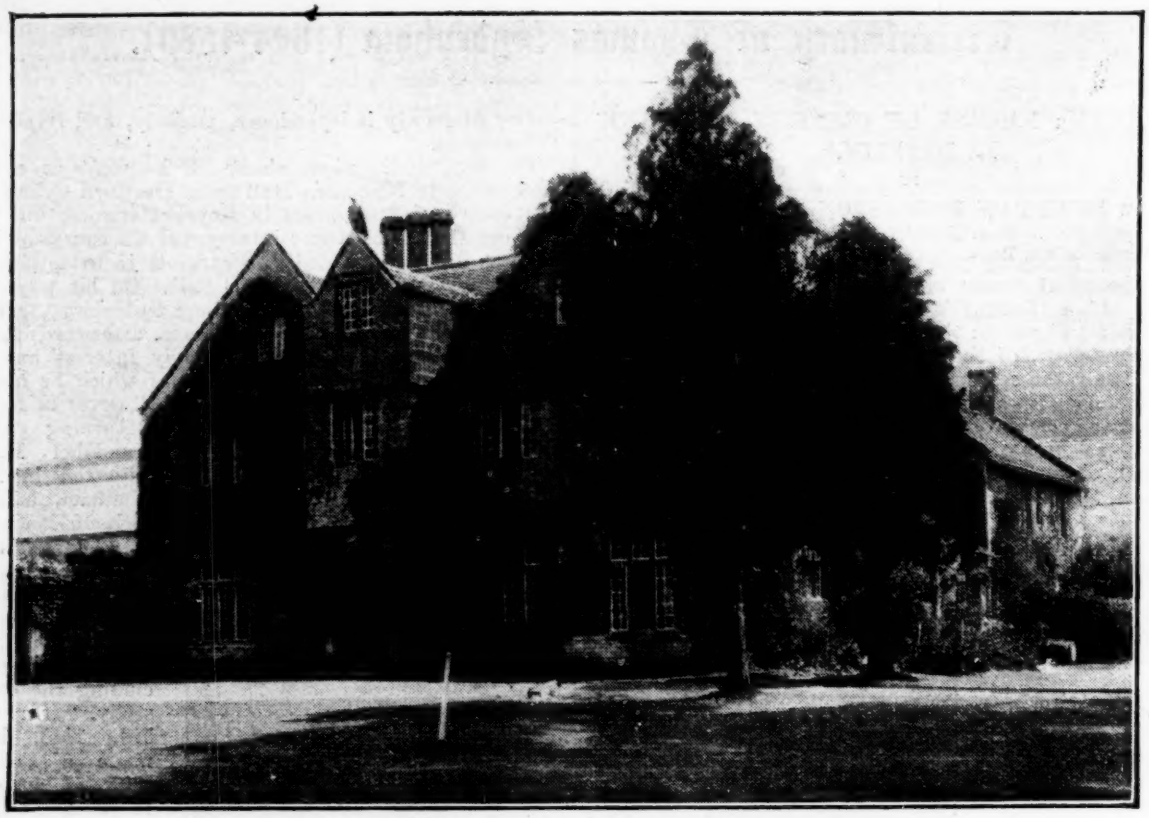


After the portrait of Sydenham, painted from life by Mary Beale, in the possession of the Royal College of Physicians of London.

Coming of an old and distinguished West Country stock, the vigour of which is shown by its survival until this present, as represented by a direct descendant, the Rev. W. B. Vaillant, who has spent many years in working at the family pedigree, Thomas Sydenham was baptized at Wynford Eagle in Dorset on September 10th, 1624, but the day of his birth is not known. There has been a good deal of confusion about the date of the birth and baptism of Sydenham, but investigations by the late Dr. J. F. Payne, and more recently by Sir Dawson Williams, make it clear that the date of his baptism only is known. The house in which he was born was rebuilt in 1630, and still stands. He was the fifth son and eighth child in a family of ten children, the strongly Puritan atmosphere of which no doubt left its mark on his hereditary character, moulding his career of sturdy independence, modesty, and freedom from self-seeking.

In May, 1642, when about 18, he went as a Fellow-Commoner to Magdalen Hall (now Hertford College), then the centre of Puritanism in Royalist Oxford, but after a few months the civil war interrupted the course of his life. He was slightly wounded at Weymouth in 1645, and did not return to Oxford until late in 1646. On his way back he visited his brother, Colonel William Sydenham, then under the medical care of Dr. Thomas Coxe, afterwards President of this College (1682), whose kindly interest and advice directed Sydenham to a profession of which he had never previously thought but by which he will never be forgotten. Returning first to Magdalen Hall, he migrated in 1647 to Wadham, and on April 14th, 1648, was by the Chancellor's (Lord Pembroke) patronage created Bachelor of Medicine, thus reversing the natural order of a degree concluding the course of study. On October 3rd, 1648, he was made a Fellow, in place of an expelled Royalist, and in the following year Bursar, of All Souls, and thus became the friend and a member of the same society as Thomas Millington, afterwards President of our College (1696). In passing it may be noted that our founder Thomas Linacre, whose death occurred just 400 years ago, on October 20th, 1524, was also a Fellow of All Souls (1484). In 1651 the recrudescence of civil war bore Sydenham away from Oxford for some months as a captain of horse, an incident responsible for the phrase, "trooper turned physician." Four years later he resigned his Fellowship at All Souls on marrying Mary Gee, and then migrated to London to start practice in King Street, in the then aristocratic quarter of Westminster, with its political attraction of the Protector's Court in Whitehall, while its swampy and malarial character provided material for his future writings on fevers. That practice did not at once become engrossing seems probable from his contesting, in his third year of residence, the parliamentary representation of Weymouth, and by his acceptance, as a consolation for his failure, of the office of "Comptroller of the Pipe" (1659). But the danger of his becoming absorbed in the duties of a sinecure was almost at once averted by the restoration of Charles II in May, 1660. It was probably about this time (1659) that he visited Montpellier, which differed from other French schools in preferring Hippocrates to Galen. The popular teacher there was a Protestant, Charles Barbeyrac, and the interesting question arises whether he fostered Sydenham's

*Address at a Reception at the Royal College of Physicians of London on November 12th to commemorate the 300th Anniversary of the Birth of Thomas Sydenham.



Wynford Eagle Manor: Sydenham's birthplace.

devotion to Hippocratic simplicity in practice and treatment, as Picard and Chauffard patriotically suggest, or whether the two were kindred spirits. However this may be, their association confers an additional title to fame on the French physician.

As Sydenham's observations on weather and disease in London began in 1661, almost synchronously with the appearance of John Graunt's first *Observations on the Bills of Mortality of the City of London*, he must then have been in practice there again, although it was not until June 25th, 1663, that he obtained from the Royal College of Physicians the licence necessary for legitimate practice; but in those troublous times many others were in the same case until, in 1664, Sir Edward Alston, the energetic President, took the matter up and brought in no less than seventy of them as honorary Fellows. That Sydenham was never a Fellow must at first sight excite surprise, and indeed it has been stated by J. C. Lettsom to have been due to the envy and enmity of the College authorities. With his independent and somewhat polemic spirit Sydenham may well in those times of political unrest have had opponents, especially in such a Royalist society as the College, and of this he was fully conscious; but a more pleasant and perhaps more solid explanation is that until 1676, when he became an M.D.—choosing Cambridge, where his eldest son William, also a licentiate at a later date, was then in residence, rather than his own university—Sydenham was not eligible for the Fellowship, and at the age of 52 he would naturally be unwilling to submit to an examination and was probably indifferent to any academic advancement. Indeed, throughout life he was strikingly devoid of ambition for worldly honours or distinctions; he never, so far as is known, applied for any post at the few existing London hospitals or sought for a medical appointment at Court. Had he been really anxious to obtain the Fellowship he might have taken the doctor's degree at an earlier period, though it is possible that his political associations might have made this a matter of some difficulty. That he had many friends in the hierarchy of the College, and that his name is mentioned in the most cordial terms in the annals from 1680 onwards, is well established.

Sydenham's early practice in Westminster included his first case of ascites—Mrs. Saltmarsh—described in his *Tractatus de Podagra et Hydrope* (1683), dedicated to Thomas Short, a Fellow of this College, which recalls other famous though less successfully treated cases, such as Dame Page, who in sixty-seven months was tapped sixty-six times and 240 gallons of water taken away "without ever once fearing the operation," and Pye-Smith's patient, also a Mrs. S——, with papilloma of both ovaries, who was tapped 299 times in nine years "without once complaining of her lot." During the plague of 1665 Sydenham with his wife and young family left London—a course of action which has aroused some adverse comment; but at this distance of time just judgement of circumstances is not so easy as offhand condemnation. His practice eventually became extensive, but as he was a Puritan amongst Royalists it was somewhat slow in developing, and he may have been handicapped by his outspoken opinions, candour in expression of his doubts, independence in ploughing a lonely furrow, and by his new methods—such as the cooling treatment in small-pox and the use of quinine, or "Jesuits' bark," against which medical prejudice persisted many years after his death. His fondness for prescribing opium ("laudanum Sydenhami") earned him the title of "Opiophilos," and he relied much on the *vis medicatrix Naturae*. Dr. John Brown in *Horae Subsecivae* called him "the Prince of Practical Physicians," and rightly, if alliteratively, so, for his sole ambition was to examine his patients thoroughly and do the best possible for them.

Thomas Dover, buccaneer and "the quicksilver Doctor," whom he treated for small-pox, and Hans Sloane, the future President of the Royal Society and of this College, whom he whimsically advised to drown himself in Rosamund's pool in St. James's Park rather than go on a botanical expedition to Jamaica, were for a time his resident pupils.

His face has been described as puritanical yet beautiful, "the fine brow, melancholy eye, and sensitive mouth revealing a nature stoical rather than harsh, sad rather than sour, as of a Puritan under protest" (F. H. Garrison).

The gout claimed Sydenham before, in Sir Thomas Browne's phrase, his "pulse beat thirty years," and the stone attacked him at the age said to be fatal to genius, that of 37. Erasmus's epigram, "I have renal colic, you have gout; we have married sisters," makes Sydenham doubly unfortunate. These gained on him, sadly hampering his

practice and literary output, and eventually he died on December 29th, 1689, in his house in Pall Mall, where he had lived since 1667, and was buried in St. James's Church, Piccadilly, where a tablet, erected in 1810 by the College of Physicians, in the south wall aisle, eloquently describes him as "Medicus in omne aevum nobilis."

To recall his works by name would be as unnecessary as it would be lengthy, for they are immortal, especially those dealing with fevers, the distinction for the first time of scarlet fever from measles and of rheumatism from gout, and the classical descriptions of chorea and of hysteria. Scholarly criticism has been much concerned about the question whether Sydenham originally wrote in English or in Latin; the conclusion that appears to have most in its favour is that he composed in the language he spoke, and that Dr. John Mapletoft and Gilbert Havers, a scholar, did his text into Latin. But whatever medium he used he painted from Nature, and, with the artistic instinct of a great clinician, emphasized the essential and kept the immaterial in due proportion.

In his attitude of "back to Hippocrates," whom he called "the divine old man," and the principle of observation rather than the precepts of authority, Sydenham insisted on the importance of the accurate description of the natural history of diseases, the constant and essential symptoms being distinguished from the accidental; he also advocated their separation into species, as in the classification of animals and plants, there being a common resemblance in their seasonal variations. Thus regarding diseases as specific, he urged that specific remedies should be sought for them. Sydenham has accordingly been regarded as the founder of scientific nosology. Further, he urged that a definite system of treatment should be established on rational grounds instead of on polypharmacy. As J. F. Payne, in comparing these two Masters of Medicine, who, as far as we know, never met, writes, Sydenham was the Master of Practice, while his contemporary William Harvey was the Master of Science.

The importance of Sydenham's practical outlook on medicine can hardly be over-emphasized, but this is not his only claim on our remembrance; for in his attempts to obtain a cure for epidemic fevers he made observations on their incidence and variations which led to his famous hypothesis of "epidemic constitutions"—a somewhat mysterious conception of a more elaborate character than those of Hippocrates and Ballonius (Guillaume Baillou) in 1574. His view of acute, especially epidemic, diseases was to the effect that they were modified by the additional factor of a constitution or influence derived not only from the atmospheric and weather conditions, as Hippocrates believed, but from telluric and other sources; thus upon a specific disease, in the modern bacteriological sense, are superimposed features due to a common factor, which, however, varies in the course of years and gives rise to what he termed "stationary fevers." Thus in the years 1661-64 "the epidemic constitution" was malarial, in 1665-66 plague-like, and in 1666-69 like small-pox. That accomplished scholar-physician, the late Joseph Frank Payne—sometime our Harveian Librarian—in his masterly life of Sydenham expressed the hope that his "sketch should induce some readers to study for themselves Sydenham's own works." Since then several Fellows of the College—Sir William Hamer, Dr. F. G. Crookshank, and Dr. Major Greenwood—have devoted much thoughtful consideration to the epidemic constitutions, and Sydenham has been rightly described by Dr. E. W. Goodall as "the founder of the modern science of epidemiology." By a kind of prophetic sense he seems to have foreseen that bacteriology might appear and be held to explain the whole question of the incidence of acute disease, and at any rate he provided reservations to such a simple and exclusive conception.

Thus the three-hundredth anniversary of the birth of the Father of Clinical Medicine in Britain and the Prince of Practical Physicians, of the Founder of the modern science of epidemiology, and of the originator of scientific nosology, "the incomparable Sydenham," should be kept in grateful and proud remembrance in his Country and College.

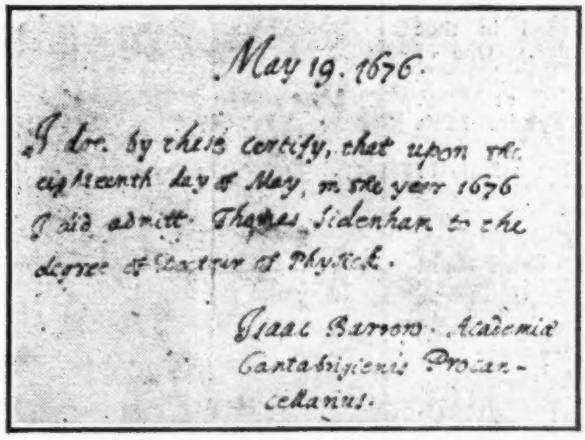
THOMAS SYDENHAM: HIS WORK AND CHARACTER.

BY

ARNOLD CHAPLIN, M.D., F.R.C.P.,

HARVEIAN LIBRARIAN.

IN the annals of medicine in this country three men may be found who, by universal consent, are honoured above all others. They are William Harvey, John Hunter, and Thomas Sydenham. Special measures have been taken to prevent the glory belonging to Harvey and Hunter from ever becoming dim, for a wise prevision has established societies and annual orations designed to perpetuate in the minds of medical men the memory of those great pioneers in medical and surgical science. But Thomas Sydenham, although his labours have left an effect upon medicine scarcely less than the work of the other two, has never been honoured by an annual oration for the purpose of keeping alive the memory of his great achievements. Indeed, apart from the society for medical publications bearing his name, the issue from time to time of his collected writings, and attempts, sometimes inadequate, to portray his life and activities, but little has been done to fix the public gaze upon the monumental work of this


May 19. 1676.

I do by this certify, that upon the eighteenth day of May, in the year 1676 I did admitt Thomas Sidenham to the degree of Doctor of Physick.

Isaac Barrow. Academiæ Cantabrigiensis Procancellarius.

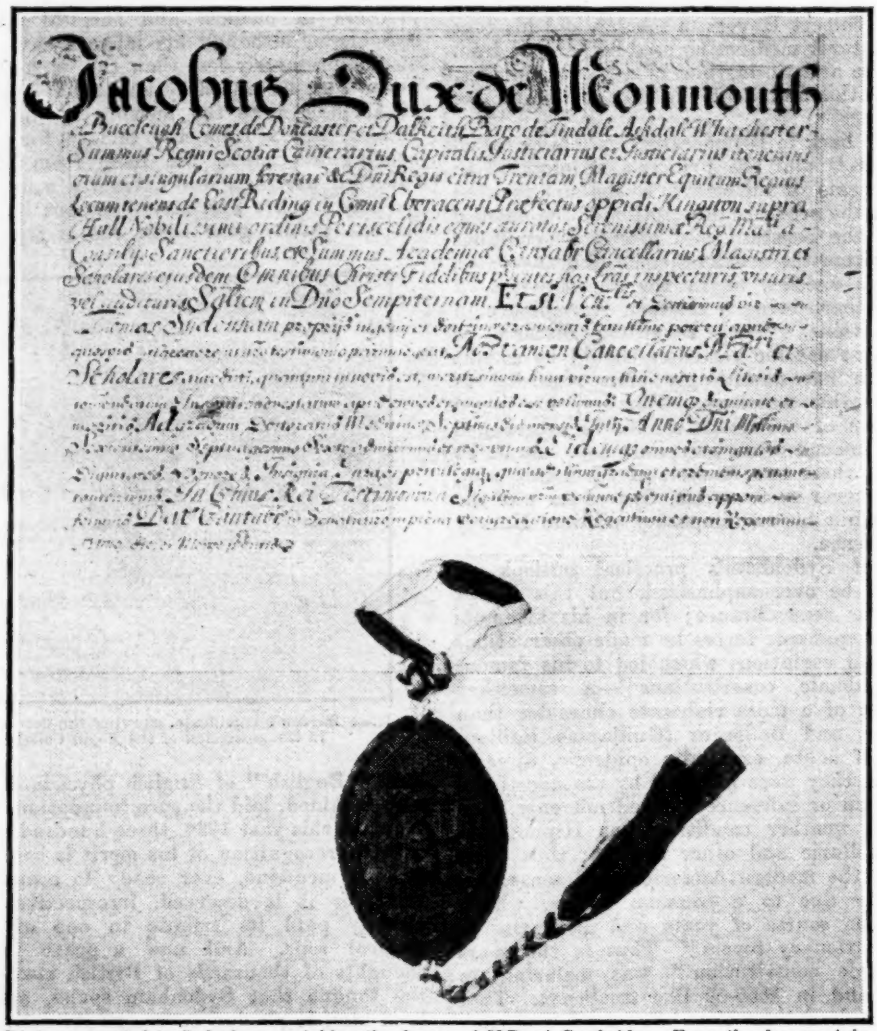
Isaac Barrow's certificate, showing the date of Sydenham's degree; in the possession of the Royal College of Physicians.

most "English" of English physicians—this rugged genius who, unaided, laid the sure foundations of clinical medicine. Now, in this year 1924, three hundred years after his birth, a tardy recognition of his merit is being laid at his shrine. French medicine, ever ready to award a scientific crown wherever it is deserved, irrespective of nationality, has already paid its tribute to one of England's greatest medical sons. And now a great journal, voicing the thoughts of thousands of British medical practitioners, in the tongue that Sydenham spake, and in the land that bred him, is placing on record its deep appreciation of the work he accomplished. At the same time the Royal College of Physicians, of which body Sydenham was a distinguished member, has held a special evening session, and through the mouth of its President, Sir Humphry Rolleston, himself a great clinical physician, has paid the debt it owes for the glory of having the name of Sydenham on its roll. This action of the College of Physicians is peculiarly fitting, for it is well known that, for reasons somewhat obscure to us at the present time, Sydenham never applied for the Fellowship of the College, nor was that honour ever offered him, although for the last thirteen years of his life he was in every way eligible. But this gathering of the Fellows of the College in the twentieth century, for the purpose of doing honour to Sydenham's name, will surely be regarded as an adequate act of penance for its omission three centuries ago. Nor must we feel aggrieved that medicine in a foreign land has paid its tribute first to our Sydenham in this year, the tercentenary of his birth, for his influence upon medicine was so great that it left its mark in whatsoever land it was practised. It knew no national boundaries. That vigorous intellect wrought for all time

and for all countries, and we do not, therefore, grudge our colleagues their first-offerings of homage to the name of Thomas Sydenham.

It is not the purpose of this article to write a biography of Sydenham, for that has been done with great ability and discrimination by the late Dr. Payne; but rather to consider his character, his mental environment, and the results for us to-day of his work. Some biographical details will, however, be necessary in order to appreciate the true position occupied by Sydenham as a great medical reformer.

Thomas Sydenham was born in 1624, at the Manor House of Wynford Eagle, in the county of Dorset. The exact date of his birth is not recorded, and it can only be stated that he was baptized on September 10th of that year. He came from an old Somersetshire family dating back to the time of King John, which multiplied exceedingly, for no less than eight branches were founded in that county. One of the branches was settled at Aller, and a cadet of this branch acquired, in the middle of the sixteenth century, the Manor of Wynford Eagle from Zouch, Lord of Harringworth. The Manor of Wynford Eagle once formed part of the great Honor of the Eagle, granted by the Conqueror to one of his companions, Gilbert, whose chief castle was at Pevensey in Sussex. Gilbert came from Aigle (Aquilla) in Normandy, and the Honor no doubt derived its name from that source.



Diploma granted to Sydenham on taking the degree of M.D. at Cambridge. From the document in the possession of the Royal College of Physicians.

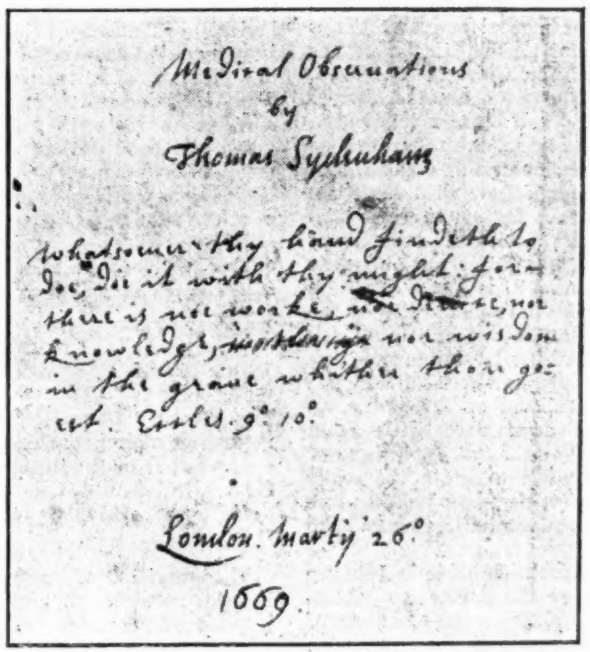
The Manor House of Wynford Eagle stands by itself at the bottom of a shallow valley in the downs of Dorsetshire, with a clear chalk stream flowing swiftly in a masoned channel at the end of the garden. It is a well kept substantial building of grey stone stained with lichen. Its chimneys are of red brick in the picturesque style of the early seventeenth century. It has the large casemented windows of the period, and the garden walls and parts of the side walls of the house are composed of the characteristic local chipped flints in panels. In the centre of the front of the house, which faces west, is a projecting porch with a room over it. On its gable is placed an eagle in stone, and under it the date 1630. Another eagle of older date, and much battered, taken down probably when the house was repaired, still stands at the top of some steps in the yard. In 1630 Thomas Sydenham was 6 years old, and, save for some inconspicuous farm buildings, the place must be now very much as it was in his boyhood. It looks to-day a very home of ancient peace, though in Sydenham's time it gave shelter to a family of valiant sons who issued forth to the stern business of fighting for the Puritans against the Royalists.

Long before the actual struggle began, the Sydenham family had become deeply committed to the Puritan cause, and Thomas Sydenham was therefore brought up under strict Puritan influences. The adherence of the family to this cause was no mere formal acceptance of its tenets, for, when the civil war broke out, the father and his five sons bore arms for the sake of their consciences on the side of the Puritans, and two of them lost their lives in battle. Thomas Sydenham had only been at Oxford for a few months when the summons came. He at once threw aside the gown for the sword, and took his place beside his valiant brothers, ready to risk all for the honour of his belief.

So far as is known, only one other member of the College of Physicians, Dr. Martin Llewellyn, actually bore arms in the civil war. At the conclusion of the first civil war Sydenham again repaired to Oxford in 1646, and, acting on the advice of Dr. Thomas Coxe, a physician in the Parliamentary army, devoted himself to the study of medicine. In 1648, being then a Fellow-Commoner of Wadham College, he took the degree of M.B. on the recommendation of the Chancellor, the Earl of Pembroke, and a few months later was elected a Fellow of All Souls. In 1650 he again obeyed the call to serve in the army, and was employed in Scotland and elsewhere, but there is no evidence that he was present at the battle of Worcester, as has been asserted. After this Sydenham remained at Oxford until 1656, when he removed to London and settled himself in practice in Westminster. During the year 1659 he paid a visit to Montpellier, but with the exception of that brief period of study, lasting less than a year, Sydenham's career was unconnected with any of the medical schools abroad. It was not until 1663, although he had already been in practice in London for some years, that he obtained the Licence of the College of Physicians to practise, and in 1676 he took the M.D. degree at Cambridge. When the great plague devastated London, Sydenham followed the example of nearly all the London physicians, and absented himself with his family from Westminster. This action must always be a matter for regret, for, had he been present, we might have possessed an almost perfect clinical picture of that great epidemic. But during his absence from London he was not idle, for he began to place on record the results of his own observations concerning disease, and especially fevers. Since the year 1661 he had been engaged in taking these notes, and in 1666 he gave

to the world his first work, *Methodus Curandi Febres*, in which the treatment of disease was approached from an entirely new standpoint.

This book of Sydenham may be regarded as epoch-making, for it was the first treatise founded on the personal observation of the physician at the bedside when attending cases. Before his time it was the almost universal practice of physicians, when writing of disease, to appeal entirely to the ancient authorities, and to neglect what their own senses had taught them. Vesalius and Harvey had already definitely broken with this tradition in the sciences of anatomy and physiology, and it was reserved for Sydenham to take the same bold step in medicine. With a knowledge, scant it may be, of the principles of medicine, he literally rejected all that had been written concerning the practice, and relied absolutely on his own unrivalled powers of observation. With two important exceptions, Sydenham had a profound contempt for the knowledge of medicine to be found in books both ancient and modern, and to the last refused to be influenced by their authority. The teachings of anatomy and physiology, which had received such an impetus from the work of Vesalius and Harvey, made no impression upon him, and he dismissed them from his system almost with contemptuous disdain. He was wedded to the belief that personal observation, and personal observation alone, could unravel the mysteries of disease. Chemistry, physiology, and anatomy might be amusing, and perhaps instructive as sciences, but he thought that they could lend no aid to the purpose he had in view. The two important exceptions mentioned above, to which he accorded his approval, were the Hippocratic writings and the philosophy of Bacon. For the former he had unbounded respect, because he was convinced that the teaching of the Father of Medicine was based on clinical observation; while from the latter he took the main principles of Bacon's system and applied it to the study of disease. The essence, therefore, of Sydenham's great innovation is to be found in the fact that he was the first to teach the great truth that disease could only be understood by watching its progress at the bedside of the patient, or, in other words, by studying Nature herself. The fine apophthegm of Bacon, which being translated reads, "We must not imagine, or think, but find out what Nature does or produces," most aptly expresses the essentials of Sydenham's work.


Medical Observations
by
Thomas Sydenham

Whatsoever thy hand findeth to do, do it with thy might: for there is neither work, nor device, nor knowledge, nor wisdom in the grave whither thou goest. Eccles. 9° 10°.

London. March 26°
1669.

Title page of "Medical Observations," in Sydenham's handwriting. From the manuscript in the possession of the Royal College of Physicians.

We must not be astonished to find that Sydenham's method was often responsible for faulty ideas concerning disease. That was inevitable, for the method was far from perfect, and much progress in the knowledge of disease had to take place before it could yield definite results. Nevertheless, from the time that Sydenham launched upon the world his clinical method, that branch of medicine has continued to advance, and has been seen in its highest excellence in the hands of Heberden, and Boerhaave in the eighteenth century, and of Bright, Addison, Watson, and Trousseau in the nineteenth century.

Sydenham's book on fevers was considerably expanded in successive editions until it embraced nearly the whole of his observations concerning disease as he saw it, and a particular merit of his writings is the clear and faithful descriptions of the clinical features of various ailments. Indeed, as Dr. Payne observed, his descriptions of many diseases are "so admirable that they have never been surpassed, nor are likely to be." This was particularly the case in his dissertation on gout, where his account of the symptoms of that complaint is so vivid and true that writers have been content to follow it without alteration. While advocating his new clinical method in his book on fevers, Sydenham laid the foundation of the study of epidemiology, and may therefore be regarded as the father of that branch of medicine in this country.

In estimating the cast of mind of Sydenham regard must be paid to his upbringing. He was nurtured in a strict Puritan household, and throughout his work the Puritan influence is abundantly evident. He had risked his life on the field of battle for the cause he believed to be right, and he was just as ready to risk unpopularity and criticism in promulgating views concerning the practice of medicine which were new, and therefore suspect. He often complained, somewhat bitterly, of the adverse criticism of his contemporaries, but, like a true Puritan, it could not turn him a hair's breadth from the course he had planned. In medicine his was a voice crying in the wilderness, and again as a Puritan he probably accepted the position with some satisfaction. He drove home the great truth that the solution of the problem of disease, its manifestations, and its cure must be sought at the bedside by means of observation and inquiry, and not by an appeal to theory and authority sanctified by time. Before the end of his life he saw that his work had not been in vain, but it was not until the eighteenth century dawned that the full effect of Sydenham's teaching was felt. In that century it may be truly said that the whole of practical medicine was dominated by the system of Thomas Sydenham. At the present day the influence of his great work is not so apparent. Nevertheless, in this, the three hundredth anniversary of his birth, our homage is no less sincere, for in him we recognize the master who made straight the road up which countless physicians have toiled to realms of more perfect medical knowledge.

Very little has been left by Sydenham in the shape of letters and manuscripts. The Royal College of Physicians possesses one most important manuscript entitled *Medical Observations by Thomas Sydenham*, a folio volume containing his observations on various diseases, the first page of which is reproduced above. It is not a manuscript of any complete work of Sydenham, but merely his notes, probably written down from time to time, and it is doubtful if the whole of it is in the handwriting of Sydenham. The College also has in its possession the signature of Sydenham,

Sydenham's signature. From the "subscription book" of the Royal College of Physicians.

on admission as a licentiate, in the subscription book of the Fellows, and this has also been reproduced. Two interesting exhibits referring to Sydenham have been reproduced. One is the certificate given by Isaac Barrow when he was Vice-Chancellor at Cambridge, and in his hand, certifying that Sydenham had taken his degree of M.D. The other is the diploma given to him by the University on taking his degree.

Several portraits of Sydenham are in existence, and three belong to the College. The most important is the portrait painted from life by Mary Beale, and this is reproduced

at page 917 Another in the possession of the College is attributed to Lely or Closterman, and fine portraits are in the possession of the Wellcome History Museum and Sir Thomas Barlow. The Mary Beale portrait, and that attributed to Closterman or Lely, have been engraved in line and mezzotint by Houbraken, Seiller, and McArdell.

SYDENHAM: REFORMER OF ENGLISH MEDICINE.

To celebrate the tercentenary of the birth of Sydenham Sir George Newman has written a biographical essay[1] which is among his happiest efforts. It is not long, it is comprehensive, and it is, almost needless to say, intensely sympathetic, for Sir George Newman, like Dr. Arnold Chaplin, comes of Puritan stock. Though Puritanism was at its beginning a religious movement, it was in its essence a habit of mind, which those possessed by it applied to all institutions and all departments of mental activity. Thus Sydenham, who held strong religious and political views as to individual liberty, and fought for them in the field, applied the same principles and showed the same love of independence when he came to study and practise medicine.

Sir George Newman's essay contains five chapters or sections dealing successively with Sydenham at Oxford, and in London, with Sydenham as a physician, with his little books, and with Sydenham the man. Rather more is said in the essay than in the two articles published above about the Oxford period; with a few months' interruption, when Sydenham fought again under Cromwell, it lasted for fully eight years. That he took an active part in the life of the University is shown by the fact that he was bursar as well as Fellow of All Souls College; he must have known every one he wished to know, and certainly numbered among his friends many men already distinguished or afterwards to become so. Whether he became acquainted with John Locke at Oxford may be doubted, but they afterwards grew to be fast friends, and Locke's resolve to begin the study of the principles of philosophy by setting down "on a piece of paper" the limits of human understanding must have been much to Sydenham's taste.

Of the Westminster to which he took his bride in 1655 we have a graphic sketch. There were the Abbey and Westminster Hall, and Whitehall Palace, some houses of courtiers and official persons, and hovels of the poor, with the swamps and marshes of the unconfined Thames around.

> "The Palace consisted of a vast congeries of buildings and pleasure grounds, covering almost the whole of what we call Whitehall, through which passed the public highway, King Street, between the glorious Holbein Gate (which stood until 1759) and the High Gate built by Richard II. It was a narrow street, with a network of smaller streets and courts on either side at its southern end. Here Sydenham lived. The houses rose three or four storeys, gabled all, with projecting fronts, the timbers painted or gilt, some of them bearing escutcheons or brightly blazoned arms, or carven beams or signs. There were taverns, and much coming and going, wagons, packhorses, pedestrians, and the motley crowd which frequent camps and courts. Down it passed the pageantry of funerals, coronations, and State shows. Lord Howard of Effingham set out from King Street to fight the Spanish Armada, Charles came down it to his trial in Westminster Hall, Cromwell lived in it, and Colonel Sydenham and many of the parliamentary leaders and soldiers."

There and afterwards in Pall Mall, Sydenham lived until his death, with apparently only two long absences, one in 1659, possibly, we may suggest, connected with the approaching Restoration, when he went to Montpellier to study under Barbeyrac, the other in 1665, when the plague was in London, when he retired a few miles. "Had he remained," Sir George Newman drily remarks, "medical literature might have been enriched by an adequate description of the plague."

Of Sydenham's disregard of the contemporaneous or almost contemporaneous work of others, Sir George Newman has no explanation. "It seems very strange," he writes. "Perhaps it was temperamental, perhaps a studied effort to exclude the influence of others upon his own mind." Yet it is rightly claimed for him that "the principles of direct clinical study, of the non-reliance on tradition and the return to Nature, of the scientific method of observation and induction, laid down by Sydenham as the foundation of sound medical practice, will endure for ever." It must be remembered that Sydenham's practice was very largely concerned with fevers, and he set himself "to define an orderly and systematic scheme of clinical study to consist of three parts: (1) an exact description of the disease before him, (2) a method of remedy, and (3), where he could discover them, the use of specific forms of treatment." Sir George Newman looks on Sydenham as having laid the foundation of modern epidemiology; he saw that certain fevers had an epidemic character which bred true, but there were, he thought, variations, the same disease manifesting itself with dissimilar aspects as to origin, formation, and decline. While he began "to feel out after the idea of contagion, though not very surely," yet he believed that "both typical and atypical fevers prevailed at certain times, dependent, he thought, upon meteorological or atmospheric conditions, or other external influences." Associated with these views was his theory of epidemic constitution, which he seems to have derived from Hippocrates. We find in the essay no very definite opinion on its worth. The controversies to which it has given rise have perhaps rather tended to obscure the great merit of Sydenham, which lies in his insistence on accurate bedside observation coupled with a system of rational therapeutics founded on careful record of the action of remedies administered with the intention of assisting Nature's own efforts to overcome the disease.

[1] *Thomas Sydenham, Reformer of English Medicine.* By Sir George Newman, K.C.B., M.D., D.C.L. London: The British Periodicals, Ltd. (Cr. 8vo, pp. 23. Price 1s.)

Scotland.

The Branch Council for Scotland has certified to the returning officer that Sir Norman Walker, M.D., has been duly elected a direct representative for Scotland upon the General Medical Council in accordance with the regulations made by the Privy Council.

Housing in Glasgow.

The provision of dwelling-houses is a serious problem for Britain as a whole, and it seems to be admitted that the general standard is lower in Scotland than in England. Within Scotland it is difficult to believe that any locality can be worse off than Glasgow. Whether private enterprise could have continued to meet the needs of the case, as it did in a fashion until within the last score of years, we do not profess to say, but clearly the no-rent developments in Clydebank are sufficient to deter the cautious Scot from risking his money in any such speculation, and so the problem is transferred to the local and central authorities. The valuable report for 1923 of Dr. Chalmers, the medical officer of health, shows how deplorable the whole position is, notwithstanding building schemes at present being carried out. A margin of 325 unoccupied houses in 1923 is wholly inadequate, even if all of them were suitable in size and otherwise for the families requiring them. In the past five years the average annual addition to the number of new houses has been slightly more than 1,200. But the average by which the births exceeded the deaths in the past four years has been more than 10,000. The Registrar-General for England assumes two persons per room as a permissible standard, but a room in Scotland being commonly larger than in England, Dr. Chalmers takes three persons per room as his measure of existing needs. Following the 1921 census report for Scotland, and leaving aside 24,853 houses of one apartment occupied by not more than three persons each, 86,425 houses of two apartments occupied by not more than six persons each, and so on for larger houses, Dr. Chalmers says there remain 14,131 one-roomed houses occupied by from four to six persons each, 1,643 occupied by seven to nine persons each, and 62 houses of one apartment in which there are between ten and twelve persons each. Of two-apartment houses there are 19,596, occupied by from seven to nine persons each, 2,832 by from ten to twelve persons, and 117 by more than twelve occupants. If the rate of increase of house accommodation in the decade 1891-1901 persisted now, the annual provision would have

been 3,804 new houses instead of 1,200. In fact, he urges, "instead of the shortage becoming reduced, it is increasing." He then proceeds to show that the average size of the apartments under the Glasgow housing scheme is considerably less than under the building regulations, as regards both floor area and cubic space, and he remarks that "the size of the smaller bedrooms cannot be regarded without some apprehension of its effect on our conception of a healthy house." He follows up the whole statement by giving statistics to show that pulmonary tuberculosis prevails, broadly speaking, in a kind of inverse ratio to the number of apartments in the houses. The percentage of population in one-roomed houses is 12.9, but they have 17.96 of the pulmonary tuberculosis, while the corresponding figures for two-roomed houses (the commonest size in Glasgow) are 49.5 and 49.93 per cent. Beyond that size of house the position is reversed. Three-roomed houses have 21.0 per cent. of the population, but only 15.74 per cent. of the pulmonary tuberculosis, while houses of four apartments and upwards have 16.0 per cent. of the population and only 8.41 of the pulmonary tuberculosis. The rest of the cases are in institutions. Corrections for age and sex distribution make some change in these percentages, but no essential alteration in the lesson they teach.

Successful Glasgow Medical Charity.

Last week a three days' bazaar was held in St. Andrew's Hall, Glasgow, with the object of raising a sum of £70,000 in aid of the Royal Samaritan Hospital for Women in Glasgow. The promoters were gratified by being able to announce that the total sum realized on behalf of the hospital was £77,786, which, with other sums still to come in, would eventually amount to £80,000. The bazaar was opened on the three successive days by the Duchess of Brandon and Hamilton, Sir John Stirling Maxwell, and Lady Blythswood.

Longmore Hospital for Incurables.

The annual meeting of the Royal Edinburgh Hospital for Incurables was held on November 7th, Sir Henry Cook, Chairman of the Board of Managers, in the chair. Sir Leslie Mackenzie, of the Scottish Board of Health, moved the adoption of the annual report, which was seconded by Sir H[illegible]old Stiles. The report pointed out that the hospital had now been in existence for fifty years, having been founded as the result of a public meeting held on December 1st, 1874. In consequence of the original effort, a house in Salisbury Place, Edinburgh, was purchased and fitted with twenty-two beds. At the present date there are two hospitals—one on the original site, and one at Liberton, some distance outside Edinburgh, the two together providing accommodation for over two hundred patients. The report drew attention to the benefits coming to sufferers from such a disease as cancer from the ministrations of the skilled nurse and daily medical supervision, benefits wholly beyond the resources of the average small household. The same might be said of patients suffering from other forms of incurable disease, such as heart disease, tuberculosis, affections of the spine, etc., but cancer was especially considered because such cases were often very urgent and short-lived. During the fifty years the managers had made every effort to extend the benefits of the hospitals, but practically all the time they had had to face a shortage of income. During the first twenty years of the hospitals' existence the total deficiency was under £2,000, but for the whole period of fifty years the total sum drawn from capital to meet deficiencies on annual income had amounted to over £93,000. In pre-war years there had been a considerable margin between the legacies received and the amount of the deficit for each year, so that after making up the deficit the managers had been able to put aside fairly large sums for extensions and similar purposes. Unfortunately, the same could not be said with regard to post-war years, and thus the possibility of future extensions would be seriously curtailed. The total number of patients treated during the past year had been 345, and the average cost per occupied bed for the year, taking both hospitals into consideration, was approximately £82 10s. 1d., which was a decrease of 1s. on the cost for the preceding year; this cost compared very favourably with that of other institutions. The report particularly noted that the two Longmore hospitals receive cases from every part of Scotland, and occasionally from England; they are intended for the treatment of those for whom the general hospitals had done all in their power, but who are still in need of hospital treatment, and for this reason a preference is always given to cases of cancer, advanced heart disease, tuberculous disease, and some of the more devastating forms of nervous disease. But the aged and infirm, who only need general attention and assistance, are not cases suitable for treatment in these hospitals. The medical report stated that 73 of the patients were suffering from cancer, 58 from advanced tuberculosis, 30 from diseases of the circulation, and 99 from diseases of the brain and spinal cord. These formed over two-thirds of the total admissions.

Edinburgh Royal Infirmary.

At the fortnightly meeting of the Board of Managers of Edinburgh Royal Infirmary last week it was reported that the receipts since the previous meeting had amounted to £6,896. It was reported further that 1,501 patients had been under treatment in the wards during the period, and that the number of cases awaiting admission to the institution was 1,813 at November 1st.

Ireland.

The Branch Council for Ireland has certified to the returning officer that Dr. Leonard Kidd has been duly elected a direct representative for Ireland upon the General Medical Council in accordance with the regulations made by the Privy Council.

Irish Medical Committee.

A special meeting of the Irish Medical Committee was held recently in the Royal College of Surgeons, Dublin, with Dr. Joseph Power in the chair. The chief business the Committee considered was a draft statement of evidence prepared by the Executive Subcommittee to be submitted to the Committee of Inquiry appointed by the Irish Free State Government to report in connexion with the Insurance Act in its application to the Free State and also the extent of the reforms that would be necessary in the existing medical services to bring them more up to date and more efficient generally. The report of the Executive Committee was considered at length and, with some alterations, was adopted. The following deputation was appointed, and waited on the Committee of Inquiry on November 7th: Dr. J. Power, Senator W. O'Sullivan, M.D., Dr. J. M. Day, Dr. P. Magner, Dr. J. P. Shanley, Dr. J. Counihan, Dr. Hennessy (Medical Secretary), and Mr. C. H. Gick (Secretary). The deputation, amongst other matters, urged upon the Committee of Inquiry the acceptance of the following recommendations:

1. The co-ordination of the system of central control of the medical and public health services in Ireland by the establishment of a Ministry of Health for Ireland (Free State).

2. The formation within the Ministry of a Health Council composed of representatives of public and professional interests, to which will be entrusted the general direction of policy in regard to the administration of the medical and health services in Ireland.

3. The establishment of an Irish Medical Service, appointed by competitive examination of an entirely practical nature and paid by the Ministry, from which will be provided the medical and veterinary officers of health, the medical and surgical staffs of the various public hospitals, sanatoriums, asylums, etc., as well as the medical officers engaged in the treatment of the insured and of poor persons.

4. The transformation and development of the present dispensary medical system freed from association with Poor Law administration and under which certain classes of persons will be entitled to receive medical, hospital, and specialist treatment.

5. The modification of the existing system of State subventions for medical and public health service and the substitution therefor

of a scheme under which the net expenditure of the local health boards, after deducting receipts from insurance, etc., sources, will be defrayed in equal proportions by the rates and the State.

6. The classes entitled to medical treatment, both general and hospital, under the new service would be (1) insured persons, (2) the poor and destitute, and (3) a class of persons who, though not insured, correspond socially or industrially to the insured, and who might be included as voluntary contributors. The income limitation of (1) and (3) and the terms and conditions of their inclusion should be a matter for arrangement between the Ministry and the representatives of the profession.

7. The proposal to provide medical benefit for dependants presents considerable difficulties, particularly in urban areas, where it would interfere very largely with the work at present done by private practitioners. The Irish Public Health Council recognized this difficulty, and postponed any proposals for dealing with dependants. The Irish Medical Committee cannot advise that medical benefits should be given to dependants. It must, moreover, be borne in mind that the provision of medical benefit for dependants would treble or quadruple the cost of providing medical benefit for insured persons alone.

8. In connexion with public health the deputation recommended (1) the appointment of whole-time county medical officers of health, (2) the medical inspection of school children, (3) mother and child welfare schemes.

The Irish Medical Committee passed resolutions protesting against exclusion of any existing medical officials from the advantages (for superannuation purposes) of Section 8 of the Local Government (Ireland) Act of 1919; and urging that all future medical officials should have compulsory pension rights.

On the motion of the chairman a very warm vote of thanks was passed to Dr. R. J. Rowlette, F.R.C.P.I., for his long and invaluable services to the Irish medical profession, especially as a member of the Irish Public Health Council and the Committee of Inquiry now sitting in connexion with the Insurance Act and the medical services in the Free State.

Ulster Medical Society.

The first meeting of the winter session of the Ulster Medical Society was held in the Medical Institute, Belfast, on the evening of November 6th. Professor Symmers, the retiring president, introduced his successor, Dr. Singleton Darling (Lurgan) in felicitous terms. Dr. Darling proposed, and Dr. McKisack seconded, a warm vote of thanks to Professor Symmers for his conduct in the chair, for all his efforts on behalf of the society, and for his hospitality. This was passed by acclamation and conveyed to Professor Symmers. Before taking up the subject of his address, "Some Observations on Public Health and Poor Law Medical Service," Dr. Darling referred in feeling terms to the five deaths that had taken place in the last year: Sir Walton Browne, Professor Symington, and Dr. J. McCaw, all past-presidents of the society; and Dr. Agnew, of Lurgan, and Dr. J. L. Rentoul, of Belfast, both vice-presidents. He returned his grateful thanks for the honour of being president. Dr. John Campbell proposed, and Dr. R. J. Johnstone, M.P., seconded, a hearty vote of thanks for the address; this was supported by Colonel Dawson, Chief Medical Officer to the Government, Dr. William Burns, and Dr. Patton (Lurgan), and passed with acclamation.

County Mayo Doctors' Salaries.

At a meeting of the County Mayo Board of Health a letter was read from the Ministry of Local Government relative to a graded scale of salaries for dispensary medical officers existing prior to the amalgamation scheme. The Minister desired to point out that as far back as 1920 Westport Union recognized the inadequacy of the salaries of medical officers and submitted a scale rising to £250 per annum. This received the sanction of the old Local Government Board. The Minister considered that the time had now come when a settlement of the claims should be arrived at, and requested the Board to take the matter into consideration and formulate a reasonable scale and submit it for the approval of the Ministry. The Board, one member dissenting, refused to formulate a scale of salaries as suggested in the letter of the Minister of Local Government and Public Health.

England and Wales.

The voting papers for the election of direct representatives for England and Wales upon the General Medical Council were posted on November 12th. They must be returned to the Registrar not later than November 20th.

Tuberculosis in Lancashire.

The annual report for 1923 of the central tuberculosis officer for Lancashire (Dr. G. Lissant Cox) has just been published. The population dealt with under the county scheme was estimated at the end of the year to be 1,772,658, and the number of cases of non-pulmonary tuberculosis under supervision was reported as 5.65 per 1,000 of the population. The death rate for the year from pulmonary tuberculosis was 0.70 per 1,000—the lowest ever recorded in the administrative county. The death rate from non-pulmonary tuberculosis was, however, 0.23 per 1,000, fractionally above that of the previous year. Sanatorium and hospital accommodation was slightly increased during the year, the number of beds under occupation at the end of each year rising from 678 in 1922 to 750 in 1923. The care committee organization of the county has been increased, there now being 17 voluntary care committees dealing with a population of 780,173, but leaving out a population of nearly one million. An amended scheme is therefore being brought into force to extend this valuable work to cover the whole of the administrative county. During the present financial year the county grant for care work is to be increased, and, where these committees do not exist, fixed sums have been allotted for the first six months to be disbursed on the recommendation of the consulting tuberculosis officer in the relief of necessitous patients. In this way help can be given in the purchase of clothing by patients going to a sanatorium or hospital, and food and clothes provided for patients under treatment at home. The proportion of consumptive patients sleeping in the same bed with other persons has decreased from 17.1 per cent. in 1921 to 10.1 per cent. in 1923, as a result of the council lending bedsteads and mattresses to patients unable to provide for themselves. Dr. Cox draws attention to the unsatisfactory feature that only a quarter of the 1,238 adult patients applying for treatment for the first time in 1923 were in the early stage of pulmonary tuberculosis, and he urges the importance of educating the public further in this respect. Improvement is reported in the matter of notification; less than 7 per cent. of the deaths from this disease in 1923 occurred without previous notification, as compared with 18 per cent. in 1918. In only 7 per cent. of the cases of death in which notification had not taken place was there no reasonable excuse for the omission.

Continued improvement is recorded in the matter of co-operation with sanitary authorities, medical practitioners, and health officials. In the year under review 76.6 per cent. of the new cases, excluding contacts, were referred to the tuberculosis officers by practitioners, pensions authorities, school medical officers, or other health officials. Tuberculosis officers occasionally visit Poor Law infirmaries for consultation purposes, and in one dispensary area the consultant tuberculosis officer pays such a visit at regular monthly intervals. Research work of different kinds is proceeding, and the county tuberculosis committee has decided to set apart a sum of money specifically for research by the tuberculosis staff, so as to prevent the cost of this falling as an extra charge on particular institutions. Whereas during the years 1881 to 1910 the prevailing type of tuberculosis in Lancashire was the "middle-age" type, affecting persons between 35 and 55 years, Dr. Cox's examination of the returns for 1923 showed that the mortality was now heaviest amongst the "young-adult" group, aged 20 to 25. The cost of the county scheme for tuberculosis, allowing for Government grants, has required a county rate of a little over 1¼d. in the £ for the current financial year. For dispensary purposes the county is divided into five large areas and two sub-areas, five chief, and eighteen branch, dispensaries being in active opera-

tion. The complete county scheme requires three more branch dispensaries. During the year 1,535 contacts were examined, of whom 119 were diagnosed as cases of definite tuberculosis, representing 77.5 per 1,000 contacts examined, a much higher figure than any random sampling of the ordinary population would give. The x-ray work increased considerably as compared with previous years.

Dr. Lissant Cox has come to a definite conclusion as regards the value of sanatorium treatment. A statistical analysis is given of the after-histories of 2,228 patients who received sanatorium treatment, and of 1,640 patients who received treatment at home or in institutions other than sanatoriums. Of 927 sanatorium patients, and 700 non-sanatorium patients, in the early and intermediate stages of disease, 17 per cent. of the sanatorium patients had died, as compared with 45.3 per cent. of the non-sanatorium patients, at the end of 1923. Similarly, of 1,301 sanatorium patients and 940 non-sanatorium patients in later stages, 69.2 per cent. of sanatorium patients, as compared with 87.4 per cent. of non-sanatorium patients, had died by the end of 1923. He adds that the educational value of sanatorium treatment is also a point of very great importance.

Maudsley Hospital Clinics.

The Maudsley Hospital offers facilities for the clinical study of all types of neurosis and psychosis, more especially those forms in which recovery is possible, and those in which the mental symptoms are associated with organic disease in the nervous system or elsewhere. The hospital itself deals with nearly 1,000 out-patients and 500 voluntary in-patients annually, and can, moreover, draw upon the mental hospitals of the County of London, which accommodate nearly 20,000 patients. The following opportunities are open to medical practitioners and students without charge: Dr. W. S. Dawson is now giving a series of clinical lectures on Tuesday afternoons on the physical causes and accompaniments of mental disorders; Dr. Edward Mapother lectures each Wednesday afternoon on mental symptoms and the mechanism of their development, and Dr. A. A. W. Petrie, on Thursday afternoons, on clinical mental syndromes. These afternoon lectures commence at 2.30. Each Tuesday morning at 11.30 there is a discussion on cases in the hospital, and on the last Friday of each month a monthly meeting, at 4 p.m., of the medical staffs of the various mental hospitals of London, at which each hospital in turn gives a demonstration of cases from its own wards. The out-patient department is open on Mondays and Thursdays for male patients, and on Tuesdays and Fridays for female patients, at 2 p.m. Appointments as clinical assistants are open, without fee, to practitioners of either sex specializing in psychological medicine. These posts can be either whole or part time, and include work in the wards, out-patient department, or the laboratories as desired. They may be held in conjunction with attendance at either of the courses for the diploma in psychological medicine, or apart from this, and they satisfy the requirements of the examining bodies for the D.P.M., or for the M.D. in psychological medicine in respect of clinical experience of mental disorders. Students may attend the clinical demonstrations required for their qualifying examination, subject to the consent of the authorities of their own medical school, the Maudsley Hospital being recognized for this purpose by examining bodies.

Medical Treatment of London School-children.

In making arrangements for the medical and dental treatment of children attending elementary schools and certain scholars attending secondary schools for the year beginning April 1st next, the London County Council has authorized provision for the treatment of 34,600 cases of eye defects; 13,200 cases of ear, nose, and throat defects; 1,750 ringworm cases (the numbers of children suffering from ringworm are steadily declining); 67,000 cases of minor ailments; and 120,000 dental cases. The total number of cases is slightly in excess of those provided for in the previous year, and the total charge, £90,950, represents an increase of some £4,000. A scheme has been approved for dealing with children with discharging ears. Five special inspection centres will be established to which children suffering from discharging ears will be referred for expert advice by one of the divisional medical officers who is an aural specialist and two half-time assistants. It has been decided to withdraw the grants to all the remedial exercise centres save one (at Woolwich), because the results obtained are held not to justify their continuation, but the question of facilitating the extension of special daily physical exercise classes for children suffering from incipient and postural deformities is being considered. For some types of deformity, when the children are unable to profit from attendance at an elementary school owing to their disability, there is in London an abundance of provision at out-patient departments of hospitals, and one of the difficulties experienced by a number of voluntary remedial exercise and massage centres has been that of obtaining out-patients, because the hospital surgeons prefer to keep them under observation in their own departments. The chief surgical causes of crippling found amongst London school-children are surgical tuberculosis and infantile paralysis. It is stated that the provision made with regard to the first is satisfactory, and with regard to the second a complete scheme has been agreed to by the Council, in conjunction with the Ministry of Health and the Metropolitan Asylums Board, for filling a gap which was found to exist in the provision for infantile paralysis cases.

Correspondence.

THE PHYSICIAN'S OUTLOOK ON TUBERCULOSIS.

Sir,—In the comprehensive and authoritative lecture on "Tuberculosis of the larynx: its significance to the physician," delivered before the Royal College of Physicians of London on November 6th (British Medical Journal, November 8th, p. 841), Sir StClair Thomson has justly pressed two points which are but insufficiently appreciated—namely, (1) the frequency in cases of pulmonary tuberculosis of associated laryngeal involvement in less or greater degree, and (2) the favourable outlook in respect of laryngeal tuberculosis when the condition has been early recognized.

The grave prognosis we are compelled to give in many cases of laryngeal tuberculosis seen for the first time results inherently, not from the character or localization of the disease, but from the fact that the laryngeal involvement has been determined only when the disease has made formidable headway.

The position is much as it used to be in former days in respect of pulmonary tuberculosis. Why was the prognosis in pulmonary tuberculosis thirty years ago—and even more recently—largely pessimistic? In largest part because, through ignorance of the natural history of the disease and the principles of preventive treatment, the diagnosis was reached too late to be effective.

With the widened outlook on tuberculosis which the past thirty years have brought, the physician is hardly just to himself or to his patient who does not proceed to the *examination of the larynx in every case of present or suspected pulmonary tuberculosis.* Such examination determines immediately the presence or absence of laryngeal involvement. In case of involvement, early determination enhances much the chance of recovery under treatment. Even in the absence of laryngeal tuberculosis, detailed inspection of mucous surfaces (buccal, tonsillar, pharyngeal, and laryngeal), which laryngoscopic examination implies, sometimes contributes considerably to the diagnosis in doubtful cases of lung disease.

I have always held and taught that the physician is not entitled to conclude a diagnosis or prognosis in pulmonary tuberculosis without thorough examination of the laryngeal and contiguous mucous surfaces. In most cases of suspected tuberculosis the up-to-date physician will go further. Granted that there is evidence that a patient is suffering from tuberculous infection, he will feel it incumbent, not to

rest satisfied with the discovery of *one focus* of disease, but to investigate the various organs in succession, in order to determine precisely the extent and limits of tuberculous invasion. Even when tuberculosis appears to be localized in one or other viscus, its import as a systemic disease—with further possible local outcrops at almost any point—must appeal to the scientific imagination and interest of the doctor. He cannot nowadays content himself with the old view that tuberculosis present in a given organ constitutes, in any strict sense, a localized disease.—I am, etc.,

University of Edinburgh, Nov. 8th. R. W. Philip.

CARBON MONOXIDE POISONING.

Sir,—It is evident from various letters on carbon monoxide poisoning which have appeared in the Journal during the last twelve months that there is much difference of opinion as to the effects of inhaling this gas. Two sets of statements are made which appear to me to be in conflict.

We are told that carbon monoxide can only accumulate in the blood up to the saturation corresponding to its partial pressure in the air, and no further.

The other statement is best defined by quoting from Rosenau's *Preventive Medicine and Hygiene*, p. 1308, 1921 edition.

"The poisonous properties of carbon monoxide are, according to Haldane, due to the great affinity it has for the haemoglobin of the red corpuscles."

"It has from 140 to 250 times greater chemical affinity for haemoglobin than oxygen."

The first statement appears to me to lay down the principle that carbon monoxide behaves, as far as accumulation in blood is concerned, precisely as any other gas would behave. If this is so, it does not matter what affinity carbon monoxide has for haemoglobin; it is beside the point, and pronouncements like Dr. Haldane's quoted above become meaningless. It is, however, difficult to accept this position because those of us who are familiar with industrial conditions of life can produce evidence that the inhalation of small quantities of coal gas is hurtful.

Is it possible that the transient combination of CO with haemoglobin damages the latter, and leaves it damaged after the CO has been eliminated? It is desirable that some of our leading physiologists should give us a clear explanation of what actually does occur.—I am, etc.,

Macclesfield, Nov. 8th. John N. Laird, M.D.

TONSILLECTOMY.

Sir,—In his letter in your issue of November 8th (p. 876) Mr. F. J. Steward criticizes the resolutions passed at the Annual Meeting by the Section of Laryngology and Otology. Surely some of his criticism is based on a wrong interpretation of the term "enucleation."

"Enucleation of tonsils" and "enucleation by dissection" are not synonymous terms. Enucleation means the complete removal of the tonsil with its capsule. This result can be achieved by several methods, of which removal by dissection is only one. Tonsils can also be enucleated with the guillotine, by the snare, and by the Waring suction method.

Since Whillis and Pybus published their epoch-making paper in 1910 guillotine tonsillectomy has been revolutionized. This method was elaborated by Sluder in America and has been brought back to us as "the Sluder tecnic." It has now been developed to a very high degree of efficiency. Sluder claims that after skill is acquired 99 per cent. of tonsils can be enucleated by the guillotine. Guillotine enucleation requires no more time nor anaesthetic than guillotine tonsillotomy. It has many advantages over the dissection method, but it requires frequent and prolonged practice to acquire the desired skill in this method. In a recent publication I have gone more fully into this subject.[1]

To return to the resolutions of the Section of Laryngology and Otology, it is the old question of tonsillectomy *v.* tonsillotomy. The Section *unanimously* recommended tonsillectomy. It is hard to realize that anyone can seriously think of going back to the old method of "snipping a bit off the tonsil."—I am, etc.

Guildford, Nov. 9th. T. B. Jobson.

[1] Tonsillectomy, *Practitioner*, August, 1924.

Sir,—I was very glad to read Mr. Steward's letter in your last issue. Is the guillotine operation to be entirely condemned? The difference between the guillotine operation and set enucleation is the difference between a minor and a major operation—if, indeed, any operation on the tonsil is ever a minor one.

Undoubtedly most guillotine operations in competent hands are clinically successful. But the occasional failure may well spell disaster to the operator, I own. As a matter of fact cases requiring tonsillectomy differ so much in ease or difficulty that it is impossible to assess the operation at its proper value. I believe myself that the problem could be solved by the invention of a properly designed guillotine. What is wanted is a properly curved frame to sink in between the faucial pillars, act as a protecting frame, and a guide wherein to withdraw a flexible blade to excise the tonsil. Is such an instrument possible?—I am, etc.,

Sevenoaks, Nov. 9th. Gerald Sichel.

PICRIC ACID: ITS USE AND ABUSE.

Sir,—I read with some interest the correspondence which appeared in recent issues of the Journal (September 20th and 27th) regarding picric acid dermatitis. Dr. Semon is anxious to absolve the dermatologist from having opened the door to this "yellow peril" among the antiseptics.

Priority in the matter of its introduction is not of real importance, and at this date may be difficult to determine, but as long ago as 1889 Cerasi and Gaucher insisted on the value of picric acid in many inflammatory skin affections apparently before it obtained a place in surgical therapeutics. In 1896 Thiéry, a Paris surgeon, advocated its use in the treatment of burns, and, impressed by his work, we tried it, presenting equally favourable conclusions in a thesis (1898) for graduation at Edinburgh. In England Sir D'Arcy Power, in 1896, wrote of the use of picric acid that "a scar remains which is as much superior to the ordinary scar from a burn as our present surgical scar is superior to that obtained by our predecessors who allowed their wounds to granulate." In Scotland, Mr. Miles said: "Picric acid at least brings the burn into the condition of a healthy healing ulcer, more simply, more safely, and more rapidly than do other methods."

Supported by such strong opinions we cannot wonder that the value of this antiseptic was "widely promulgated in British medical literature."

But if picric acid is used on a burnt surface a definite method must be employed. In the first place, Thiéry's formula is: Picric acid 12 grams, boiled water (tepid) 1 litre; allow to cool and decant. Secondly, sterile gauze (never lint) is dipped in this solution, squeezed fairly dry, and applied to the burnt area. The gauze is covered with a very thin layer of wool and fixed with a gauze bandage. The value of this dressing is obtained from its rapid evaporation.

In over twenty-five years' experience of picric acid in burns my partner and I have never seen the slightest dermatitis when it is applied in aqueous solution. Once, when a 5 per cent. alcoholic solution was used as an antiseptic before operation on a breast case, dermatitis followed, curiously similar to the case mentioned by Dr. Semon, the difference being that in our case the dermatitis appeared after the operation, not before. But the alcoholic solution used elsewhere in the body for disinfecting the skin has never produced the slightest irritation in our experience.

Picric acid, therefore, if used on burns, must be applied in aqueous solution, never in an ointment, never on lint.

But the use of picric acid is not limited to the treatment of burns, for as a medium for preparing catgut the surgeon will find it most satisfactory. For many years we have used a saturated solution of picric acid in clove oil for this purpose, as recommended by Roeder of Nebraska, with very slight modification. Any variety of dry catgut, plain or medicated, is simply placed in this solution, where it remains indefinitely. For use, the spools of catgut are transferred to absolute alcohol and are at once ready for use. Personally we prefer chromic catgut, 6/0 or 8/0 for fine ligatures and all gastro-intestinal work, and a No. 1 formalin strand for larger vessels, small pedicles, and the suture of muscle and aponeurosis. Prepared in this simple

way these types of catgut become pliable, acquire considerable tensile strength, and are perfectly antiseptic when manipulated with a gloved hand.

We believe, therefore, that picric acid is still of considerable value in surgical practice. But it resembles another valuable and powerful drug—chloroform—in this respect: picric acid should never be applied to the skin, nor chloroform on a mask for anaesthesia, through the medium of that impermeable substance called "surgical lint." The use of lint in either case violates the essential principles on which their successful use depends.—I am, etc.,

Huelva, Spain, Oct. 31st. IAN MACDONALD, M.D.

SIR,—In view of the notes appearing in your issues of September 20th and 27th, pp. 520 and 599, with reference to picric acid dermatitis, the following case may be of interest:

A woman, aged 25, was admitted to the extern department of Dr. Steevens's Hospital on August 3rd, 1924, suffering from a scald on the dorsum of the left hand. This was dressed at once with a 1 per cent. aqueous solution of picric acid, and subsequently daily with this dressing until August 24th, when the left forearm became very sore, and on examination was found to be marked all over the flexor surface with a linear discoloration, the long axis of which corresponded with that of the arm. These marks were about 2½ inches long and about three-eighths of an inch wide; they resembled in appearance the condition of the skin in burns of the second degree, after the bullae have burst.

I saw the patient on October 17th, and I thought the condition was due to the picric acid. I obtained her consent to do a test on her right arm. I did a cutaneous test with a similar solution of picric acid in a manner resembling the von Pirquet tuberculin reaction. The next day there appeared a raised red papule, about half an inch in diameter, very tender to touch; on the following day the lower part of the forearm presented an appearance exactly similar to the left forearm; the entire right arm became gradually affected.

The patient is still attending the hospital and seems to be much improved by her treatment with alcohol locally.—I am, etc.,

FRANCIS S. BOURKE,
Assistant Pathologist, Dr. Steevens's Hospital.

Dublin, Nov. 3rd.

THE IMPROVEMENT OF OBSTETRICS.

SIR,—Dr. Louise McIlroy's letter in your issue of October 4th and other letters in the issue of October 18th are full of interesting suggestions for the improvement of obstetrics, but there is a curious conflict of views as to how improvement is to be obtained and the value of present methods for dealing with difficult cases. Dr. McIlroy suggests that the midwife is rapidly cutting out the medical practitioner, and points out that 50 per cent. of confinements are managed by midwives, whom she describes as "a highly skilled body of specialists." The fact is that 50 per cent. or even 70 per cent. of all cases can be efficiently managed by a midwife because they require no management at all, being normal cases and the less interfered with the better. The remaining 30 per cent. of cases are those requiring management, and in this respect intelligent observation rather than active treatment is required. Nearly all complications occurring in labour present signs or symptoms at the start of labour indicating that the condition is not normal. It may be difficult or even impossible for the most skilled specialist to say what the final result of some such cases will be: the majority will be easily dealt with if recognized and treated at the proper time; instead of which, as so often occurs, the early signs not being recognized, the case is treated as a normal one until actual difficulty or distress has developed. The practitioner is then called in; whether skilled or otherwise he is asked not only to treat the primary abnormality but to do so in spite of the further complications that have developed through neglect of the condition. If the practitioner is skilled he may be able to make the best of a bad job, but, as he is often little more skilled than the midwife, he is most likely to overlook the primary cause of the difficulty and concentrate on getting the case finished off as soon as possible by any means, and often the wrong means.

Many general practitioners and midwives are highly skilled, and their skill chiefly lies in diagnosis; when they meet complicated cases they recognize them, and, being wise in their generation, they send such cases into hospital, where such treatment as is necessary can be applied when applicable. Much of the difficulty in obstetrics at present arises from the fact that in 80 per cent. of cases the patients are able to deliver themselves, and do so; but since more than half the people conducting midwifery cases are not capable of saying whether a case is normal or abnormal, a large number of the remaining 20 per cent. of cases is mixed up with the 80 per cent. At the start of labour each one of those 20 per cent. of patients looks, and is, perfectly well, and the amount by which they vary from the normal case may be very small; but the variation is always there, and will prevent anyone with a proper knowledge of the normal from classing the case as normal. The ignorant attendant does not recognize the variation, or worse, having noticed it, thinks it is so little as not to matter and lets the case continue until distress develops.

There are a few, but very few, midwifery cases in which labour starts normally and which do not terminate normally; with the exception of simple low forceps application for the end of the second stage such cases never come to much harm. In a moderate number of cases complications only develop in the third stage, and here again the vast majority have early signs that the process is not progressing normally long before any symptom of the chief complication of the third stage, excessive haemorrhage, has developed. A number of cases are, however, allowed to continue in spite of the early signs until the patients are suffering from actual loss of blood. So far as the midwife is concerned this is asked for by the Central Midwives Board regulations, which instruct her to send for medical aid, "when there is excessive bleeding," . . . "after two hours delay." That is not the time when aid should have been sought; help will probably arrive when the patient is moribund.

With regard to ante-natal management nearly all the complications of pregnancy develop gradually, and are amenable to treatment if treated early; most are preventable by maintaining a healthy mode of life. Pregnancy is not a disease; it occurs in health, and generally as a result of good health. Nevertheless the state of pregnancy upsets metabolism, and the organs of metabolism may require a little help during pregnancy; they must be protected from abuse, and advice and guidance rather than treatment is what is required. If a woman is found during pregnancy to be suffering from some condition which will cause difficulty in labour, she should be at the time of labour where that disability can be treated, or such measures should be taken as will obviate the consequences of the disability. She probably does not require any treatment during pregnancy. Taking things all round, diagnosis is what is required during pregnancy and labour rather than treatment. There are ample means of placing any complicated case of pregnancy or labour under efficient treatment in the hospitals and infirmaries, if only the abnormalities, or the probability of complications, were recognized as soon as they are recognizable. If this were done the midwives would not have complications becoming neglected, and the practitioners would not be called in to treat debilitated patients, nor allow their own cases to develop dystocia. To effect this in practice it is necessary to alter the present view of obstetrics taken by the public and the profession, and to alter the lines of teaching. My suggestions for this are as follows:

Midwives should be taught normal labour and how to conduct a normal case. This should include the ability to say confidently that a case is normal, as the result of recognizing the characteristics of a vertex presentation properly applied to the pelvic brim. If the midwife cannot establish that fact by palpation the case comes under the classification of "Where no presentation can be made out" or "A malpresentation." I personally greatly doubt the justifiability of leaving a breech presentation to a midwife. When a presenting head is free above the pelvic brim the condition does not conform with the normal start of labour; 70 per cent. of such cases will end spontaneously, but leaving all such cases to see what will happen results in obstructed labour in the other 30 per cent. It is not necessary for the midwife to diagnose the particular abnormality; it is sufficient for her to recognize that the case is "not normal," and therefore one which is not in her

province to conduct. A midwife should be able to recognize that labour is progressing normally; when it ceases to do so the case should be referred, instead of waiting till distress sets in. A midwife should hardly ever make a vaginal examination. If labour is progressing normally none is required; if labour ceases to progress the fewer examinations made the better, if operative interference is required. A malpresentation can seldom be diagnosed early per vaginam, and there will always be the facts referred to above to prevent the case being considered normal. A midwife should understand the normal third stage and know exactly how to assist it; if it does not follow the normal course she should send for aid, and in the meantime simple methods of control will prevent excessive loss until aid arrives. Those occasional cases of very rapid loss of blood early in the third stage following a normal delivery always occur in multiparae, and there is always a history of a minor degree of the same complication happening in former labours. This history should be obtained by ante-natal investigation, but the attending midwife is seldom unaware of the previous history, and the patient should be advised to go into hospital or have assistance at the birth of the infant. The patient will never object when she is told that the complication can be prevented by early treatment and the risk of delay is explained. To sum up, the duties of a midwife should be to conduct normal labour in normal cases, and be competent to recognize when a case is "not normal." It is quite unnecessary for her to diagnose the exact abnormality, or know the treatment; she may have a rudimentary knowledge of what is required if she knows what is wrong, but, as the treatment of any complication will vary with the associated conditions, she cannot be expected to know the proper treatment to be applied in the individual case.

With regard to the training of midwives, a woman with no previous medical training is expected at present to be trained in six months. If at the end of that time a woman has learnt to recognize and conduct a normal case, manage the baby and breast feeding, and do things with a reasonably safe degree of surgical cleanliness, she has done extremely well, and will be a safe midwife without being able to diagnose more than that a case is not a normal vertex presentation.

Now, as regards the teaching of obstetrics in the medical schools, the student is expected to take practical obstetrics in his fourth or fifth year, but he has to fit it in as best he can with his other hospital practice. There should be a definite period, say three months, at the end of the fourth or during the fifth year when the student would devote the whole of his time in hospital to the study of obstetrics, and during that time be excused from general hospital attendance. During these three months a student should learn normal labour thoroughly, and be absolutely confident in saying a case is normal and that progress is normal, or that a case is not normal or progress is not normal. He should know at the end of his time how to conduct a normal case, manage the third stage, and how to examine thoroughly a patient to establish the fact that the case is normal or abnormal. During the process of obtaining this knowledge he will meet a certain number of abnormalities and become cognizant of their characters, but, what is more important, he will learn to detect any cases which do not conform with the normal. It is essential that a student should conduct a number of normal cases, since without doing this he can have no opportunity of learning the characteristics of the process. In pneumonia the physical signs are present for days, and so a number of students can learn them and repeatedly observe them in a single case. In labour the characters are constantly changing, so that even one student cannot repeatedly observe them; several cases are therefore required to teach one fact to one student so that he will become reasonably cognizant of it. In the same way instruction must be given in obstetric wards or hospitals, and normal cases are required for this instruction so that the student may be taught to palpate and practise diagnosis.

With the present curriculum so little time is given to work in obstetric wards that nearly all of it has to be devoted to conducting labour cases, while the essential knowledge of diagnosis and prognosis is neglected. The number of times a student is likely to see an abnormal presentation in three months is not sufficient to teach him anything of the individual conditions. Take, for example, the last report of Queen Charlotte's Hospital. Confinements, 1,779; breech presentations 83, transverse presentations 11, brow presentations 3, face presentations 2; on the other hand, there is no excuse for a student not learning all the characteristics of a normal vertex—1,702 cases. Of course, in a number of these there were other complications; 140 were contracted pelvis cases. The points indicating this condition can be learnt, and such cases be distinguished from frankly normal ones. The treatment is seldom such as can justifiably be undertaken in a patient's home, but the condition can and should be recognized before labour or early in it.

At the final examination a student should know normal labour as well as he is expected to know anatomy and physiology; he should have a theoretical knowledge of abnormal labour and a thorough knowledge of the progress and management of normal labour so as to recognize any alteration if it develops. When the student becomes qualified, if he wishes to take up obstetrics let him devote time to the further study of that branch in the same way as he would if taking up ophthalmology, pathology, or surgery.

The general public require to learn that although the vast majority of confinements can be conducted by anyone with a small knowledge and the ability to recognize that the case is normal, the same person is not qualified to deal with an abnormality. When the public learn this, they will cease to ask the practitioner who looks after the family to treat the mother for abnormal labour, or, when the midwife says she wants assistance, be satisfied with the calling in of the nearest doctor or the family physician. The general practitioner with a real knowledge of obstetrics in any district is the one who, from his special knowledge, sends patients into hospital at an early stage for treatment which cannot be carried out safely in the patient's home.

Dr. McIlroy's suggestion of whole-time specialists is quite impracticable. She points out that there are 700,000 confinements in the year: in the extern department of the Rotunda about 2,000 cases are attended yearly; there are two extern assistants with the hospital behind them to supervise these cases, although many of the abnormal cases are weeded out during pregnancy and brought into hospital. From my own experience as extern assistant I would not take it on as a life occupation; anyone who did so would be a lunatic or a drug maniac within two years. The responsibility would be unendurable, to say nothing of the constancy and irregularity of the work. At this rate something over 700 specialists would be required. Where could they be obtained, and what would be their qualifications?

As it is, with the present obstetric hospitals and wards of hospitals in the large towns and the cottage hospitals and infirmaries in the country, there are ample means of dealing with abnormal midwifery—if the abnormal cases were recognized early instead of when complications have developed, and have to be dealt with as best can be in unsuitable surroundings, short-handed, and by someone who has never met a similar case before. The present faults in obstetric practice will not be overcome by a new body of officials, nor by making the present midwives and doctors afraid to undertake anything because everything they do is to be scrutinized by a superior official who probably has no knowledge of obstetrics. It can be overcome by teaching doctors, midwives, and the public the limitations of the man or woman midwife, and utilizing the present institutional facilities.—I am, etc.,

Rotunda Hospital, Dublin, Oct. 18th. GIBBON FITZGIBBON.

RECTAL INJECTIONS OF SEA-WATER FOR THIRST.

SIR,—Your article "In open boats," reviewing Captain Foster's book on his remarkable voyage, recalls to my mind some correspondence in the JOURNAL six and a half years ago. In the issue of February 16th, 1918 (p. 220), appeared two letters, one based on actual experimental evidence, advocating rectal injections of sea-water for the alleviation of thirst due to a lack of drinking water.

I cannot at the moment put my hands on an analysis of sea-water showing its exact saline content, but what one wants to know is: Is hypertonic saline of a saturation akin to salt water tolerated by the bowel, and will water be absorbed from it in the colon, as in the case of ordinary normal saline; or will it produce, as in the case of purgative salts held in hypertonic solution in the intestine, a flow of fluid *from* the tissues *into* the bowel? An authoritative statement is urgently needed on these points.

If water can indeed be absorbed from hypertonic salt enemata, then surely steps should be taken to spread this knowledge to those who go down to the sea in ships. It is dreadful to think of brave lives perishing in the midst of plenty. Responsibility for a clear declaration as to the efficacy or the reverse of such hypertonic salt injections should rest with the medical profession.—I am, etc.,

Reading, Nov. 10th. W. BERNARD SECRETAN.

POST-MORTEM EXAMINATIONS.

SIR,—As a general practitioner of many years' standing I feel very strongly that a special department with paid medical officers should be created to conduct *post-mortem* examinations. The medical officers might well be attached to boroughs or districts, and be paid by the State or the county council, as are the tuberculosis and health officers. The usual *post-mortem* examination made by the general practitioner is of little real value, and, unless the cause of death is perfectly obvious, it is an extremely difficult procedure, requiring skill and technique which an ordinary practitioner cannot be expected to retain as years go on. I believe that the valuable information gained by such expert examinations would benefit both the profession and the public. The present system is wrong and antiquated: this, if I remember rightly, has been recognized long since in Canada, where such a special department has been created.—I am, etc.,

Horley, Nov. 2nd. S. A. CLARKE, M.R.C.S., L.R.C.P.

PERNICIOUS VOMITING OF PREGNANCY.

SIR,—Dr. Denyer's account (September 13th, p. 455) of a case of pernicious vomiting treated by lavage of the stomach and glucose, in accordance with the theory of hepatic origin suggested by Duncan and Harding, is very interesting in the light of Cramer's[1] work on the action of insulin on the glycogenic function of the liver. Cramer seems to have shown that the glycogenic function of the liver is an "autonomous secretory function," which is inhibited by insulin and stimulated by thyroid and adrenal hormones.

Glucose has been shown to be a safeguard against post-salvarsan jaundice, and someone has suggested insulin to combat the worst phases of acute hepatic crises. (Unfortunately the reference to the latter suggestion has slipped my memory.) The two methods seemed contradictory until the work of Cramer showed their connexion. According to him the glycogenic function of the liver is continuous, whether there is carbohydrate to act on or not. If no carbohydrate is available it converts protein into glycogen. This glycogen is secreted into the blood as glucose at a rate depending on the concentration of glucose in the blood. The introduction of glucose into the blood, therefore, whether directly or indirectly through the alimentary tract, would lessen the work of that organ in so far as it would obviate the necessity of secretion of sugar into the blood. The administration of insulin over and above the use of glucose would still further rest the liver in that it would arrest its glycogenic function also. The principle involved in both methods of treatment is therefore the same—resting the damaged organ, a principle well known in medicine.

Personal opportunity has so far been lacking for the administration of insulin in hepatic crises, but among a number of patients at present under observation with disordered livers I hope soon to put the theory to the test. It would be interesting to know if any general practitioner or hospital physician has yet used insulin in such cases.—I am, etc.,

CRAWFORD LUNDIE, M.D.

Thaba 'Nchu, Orange Free State, Oct. 10th.

ASSISTANTS IN GENERAL PRACTICE.

SIR,—I have been an assistant in general practice now for five years, during which time I have held two posts other than my present one. I left my previous posts entirely on my own account as there were no prospects, and I have excellent testimonials all through. My present salary is £300.

Owing to family calls on my limited income I have been so far unable to save sufficient capital with which to purchase a practice or even a share of one.

I have been a member of the British Medical Association since starting in practice, but I fail to see what it has done for the good of an assistant generally. The Association has done some very excellent work for the profession in other ways, but at the moment I feel constrained to advise all newly qualified doctors who intend to commence as assistants not to join the British Medical Association until they have at least completed the assistant stage.

My first employer said to me: "You are very lucky; when I was an assistant twenty-five years ago I only had £120 a year." But times have changed during the past quarter of a century. For my next employer I had to sign a bond which excluded me (on leaving) from practice for ten years within a twelve miles radius from where I then resided. I ascertained that such a bond was quite in order for a country practice, but why should it be so ridiculously stringent?

Let us hope that the very able suggestion of "Ex-Assistant" (October 11th, p. 690) will be carried out, and that the Association will investigate the conditions which he rightly refers to. For our membership subscriptions we expect to get some consideration other than a copy of the JOURNAL once a week.—I am, etc.,

October 25th. ANXIOUS.

SIR,—In view of the large number of newly qualified practitioners now joining the British Medical Association, I think more attention should be directed to the conditions under which many of these have, owing to lack of capital, to serve as assistants. I notice in advertisements in the JOURNAL that the salary offered to some assistants is not mentioned, and I am aware of a case in which the post was given to the candidate willing to take the lowest salary. Many assistants are ungenerously treated as regards off-duty, and are not later taken into partnership, as it is cheaper to obtain a new assistant fresh from hospital.

It is not a true comparison to declare the salary of a house-officer at a hospital enough for an assistant, because the opportunities for learning are not the same. How many practitioners take the trouble to teach their assistants anything?—I am, etc.,

November 2nd. OXONIAN.

THE GENERAL MEDICAL COUNCIL ELECTION.

SIR,—Will you allow me, through your columns, to thank the registered medical practitioners of Scotland for the expression of their confidence shown by my unopposed return to the General Medical Council as their Direct Representative?

It shall be my constant endeavour to continue to merit their trust.—I am, etc.,

Edinburgh, Nov. 11th. NORMAN WALKER.

Medico-Legal.

CLAIM AND COUNTER-CLAIM.

IN the Leeds County Court, on October 3rd, Dr. J. Logan, of Chapeltown Road, Leeds, succeeded in recovering from Mr. M. Gilston, of Chapeltown, the amount of charges for professional attendance by Dr. Logan upon the defendant's child and also resisted a counter-claim by the defendant, who alleged negligence and unskilful treatment, the jury being unanimously of the opinion that there had been no negligence whatever and that Dr. Logan did his best in difficult circumstances.

It appears from the reports in the *Yorkshire Evening Post* that Dr. Logan diagnosed a serious bowel obstruction and advised a strict diet of breast milk for the baby. The illness continuing, Dr. Vining of Leeds was called in, and he, whilst confirming Dr. Logan's diagnosis, suggested stomach-washing, which was carried out daily. Dr. Watson, another Leeds specialist, was also called in, and approved this treatment, but Mr. Gilston, being dissatisfied, called in Dr. Friend, who adopted the method of administering cod-liver oil by inunction. The child ultimately recovered.

Counsel for the defendant submitted to the jury that Dr. Logan had been negligent in not adopting some form of treatment other than that which, he said, was not having the beneficial effect he hoped it would have upon the defendant's child. The methods of Dr. Friend before the recovery of the child were recognized as ordinary feeding methods. Nobody had suggested Dr. Logan did not know them. He submitted that Dr. Logan was negligent because he did not take the advice of anybody for four weeks while the child was getting weaker and rejecting everything given in the ordinary way as food, and because he did not resort to the method of feeding through the pores. No child could vomit cod-liver oil rubbed in through the pores of the skin.

Judge Woodcock, in summing up, said there was not a medical man in the country, however eminent, who dared go into the box and swear that Mr. Gilston's child would have died if it had not been treated by Dr. Friend, or that it was purely the treatment

[1] Cramer, *Brit. Journ. of Exper. Path.*, 1924, 5, No. 3, p. 128.

given by Dr. Friend which resulted in its recovery. It was just as likely that the treatment given by Dr. Logan, and approved by the specialists, was the effective treatment in the case, because apparently it was usual for some time to elapse before improvement was noted. It could only be a matter of opinion, and there could be no possible evidence either way.

Dr. Logan's case was undertaken on his behalf by the London and Counties Medical Protection Society.

Universities and Colleges.

UNIVERSITY OF OXFORD.

SCHOLARSHIPS and Exhibitions in Natural Science are announced for competition as under: December 9th, 1924, at University, Balliol, Oriel, Lincoln, and Magdalen Colleges, Christ Church, Trinity, St. John's, and Hertford Colleges; March 17th, 1925, at Merton, Exeter, New, Brasenose, Corpus Christi, and Wadham Colleges.

The University has granted, by a decree of congregation, a sum of £3,000 towards the expense of providing a joint lecture room, library, and workshop for the departments of physiology and bio-chemistry.

At a recent congregation the degrees of B.M., B.Ch. were conferred on J. W. Alden.

UNIVERSITY OF LONDON.

DR. E. MAPOTHER has been recognized as a teacher of mental diseases at King's College Hospital Medical School and Mr. Gerald R. Lynch as a teacher of forensic medicine at Westminster Hospital Medical School.

Mr. H. J. Waring has been appointed to represent the University and King's College at the celebration of the fiftieth anniversary of the School of Technology of the University of Brussels this month.

The University Medal in Branch I (Medicine) of the M.D. examination for internal and external students, July, 1924, has been awarded to John Norman Kerr, B.S., an external student of St. Bartholomew's Hospital, and the University Medal in Branch IV (Laryngology, Otology, and Rhinology) of the M.S. examination for internal and external students, July, 1924, has been awarded to Victor Ewings Negus, an internal student of King's College Hospital.

UNIVERSITY OF BIRMINGHAM.

THE Council of the University of Birmingham has decided to confer the title of Emeritus Professor upon Dr. Thomas Wilson, late Professor of Midwifery and Diseases of Women.

NATIONAL UNIVERSITY OF IRELAND.

THE following degrees and diplomas were conferred on November 3rd:

M.D.—Kathleen B. White.

M.B., B.CH., B.A.O.—M. J. Bryson, J. D. Hourihane, J. C. Flood, A. W. Spain, T. Plunkett, J. P. Collins, J. J. Silke, J. Donovan, M. J. Cooke, A. L. Butler, L. H. Garland, A. Kirby, W. D. O'Donoghue, Honoria Aughney, F. B. Bourke, M. J. Boyce, P. F. Browne, A. J. Cantwell, P. J. Conwell, Kathleen M. Cunningham, W. J. Doody, K. Egan, P. R. Fanning, Agnes C. Farrell, T. W. FitzGerald, Mary B. Flynn, E. Gallagher, R. Gardiner, R. E. Gordon, J. Hardy, N. J. Hardy, M. S. Honan, C. F. Keane, J. L. Kearns, Maggie J. McColgan, T. G. A. McElhinney, F. B. McEvoy, G. F. McGahan, P. A. McGarvey, J. P. McGorry, P. W. McGowan, S. P. McGrath, Annie M. T. McGreen, Hilda K. McKernan, D. Mulcahy, Eveleen J. O'Brien, J. S. O'Brien, J. O'Connor, M. O'Leary, J. A. Pierse, Catherine Portley, Mary M. B. Reavy, W. Shortis, Anne M. Stafford, J. J. J. Sweeney, R. H. Taylor, J. C. A. Woods.

B.SC. IN PUBLIC HEALTH.—Annie Scully.

D.P.H.—N. A. Canton, Marie S. Moore, J. C. Troy, Kathleen G. McColgan, J. Phelan.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

THE annual meeting of Fellows and members will be held on November 20th at 3 p.m. at Lincoln's Inn Fields.

We are informed that the following resolution will be moved by Dr. W. E. A. Worley and seconded by Dr. M. I. Finucane on behalf of the Society of Members of the Royal College of Surgeons of England:

> That this thirty-seventh annual meeting of Fellows and members again affirms the desirability of admitting members to direct representation upon the Council of the College; moreover, this meeting requests that the President shall hereupon reply in detail to the two resolutions passed at the last annual meeting, and that he shall also state whether his Council has seriously considered any means whatever whereby the collective views of members of the College may be ascertained on matters affecting their interests as members.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND.

THE following candidates have, after examination, been duly admitted Members and Licentiates in Medicine of the College: A. H. Davidson, C. J. C. Earl, R. H. Micks.

V. A. Newton, having passed the required examination, has been admitted to the Licence in Midwifery of the College.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

AT the annual meeting of the Royal Faculty of Physicians and Surgeons of Glasgow on November 3rd the following officers were appointed: *President*, Dr. T. K. Monro; *Visitor*, Mr. J. H. Pringle; *Treasurer*, Mr. J. H. MacDonald; *Honorary Librarian*, Dr. E. H. L. Oliphant.

Obituary.

ALFRED JASPER ANDERSON, M.A., M.B., D.P.H.,

Formerly M.O.H. Capetown.

THE death of Dr. Jasper Anderson, late medical officer of health of Capetown, which occurred on October 2nd, is deeply regretted throughout South Africa, and particularly by members of the British Medical Association, of which he had been for many years one of the ablest and most loyal supporters.

Alfred Jasper Anderson was born at Manchester in 1858. From Manchester Grammar School he went to Oxford, and studied medicine at St. Bartholomew's Hospital, London. He obtained the diploma of M.R.C.S. in 1882, and graduated M.B.Oxon in 1883. He received the D.P.H.Camb. in 1888. He won the Radcliffe Travelling Fellowship at Oxford, and spent much time in Leipzig and Vienna. After a period of general practice in Salford, he took up Public Health work and became medical officer of health for Blackpool. In 1901 he became the first whole-time medical officer of health of Capetown, and was responsible for the organization of the Health Department and its administration until his retirement, owing to ill health, at the end of 1922. Until last year he had held the professorship of hygiene at Capetown University. He devoted himself enthusiastically to work in connexion with the British Medical Association, both in England and in South Africa, and, after holding various offices in the Cape of Good Hope—Western Province Branch, he became its president in 1909. He was a member of the Branch Council from 1909 to 1920, and represented the Branch at the Overseas Conference held in London in July, 1921. Dr. Anderson was one of the original members of the South African Committee from 1911, and succeeded the late Sir Kendal Franks as president. Until prevented by impaired health in 1922, he had been a regular attendant at the medical congresses. In 1919 he was elected to the Colonial Medical Council, and remained a member of it until his death.

He is survived by a widow, one son, who is a Major in the Indian Medical Service, and a daughter.

Dr. GEORGE AUGUSTUS THOMPSON of Darwen died from pneumonia on October 29th, aged 48. He was the son of the late Mr. James Thompson, for twenty-five years head master of Holy Trinity School, Darwen, and was educated at St. Mungo's College, Glasgow. He took the triple Scottish qualification in 1899, and had been in practice in Darwen for the past twenty years. He was a member of the Blackburn Division of the British Medical Association and of the Darwen Medical Society, of which he had been president and secretary. During the war he served with a temporary commission in the R.A.M.C., and was attached as medical officer to the Royal Field Artillery. He leaves a widow and two sons.

Dr. OLIVER H. A. MAGGS of Haworth died on October 19th, aged 72. He was a native of Bourton, Dorsetshire, was educated at Uppingham School, and subsequently became a student at Charing Cross Hospital Medical School. He took the diploma of L.S.A. in 1892 and that of L.M.S.S.A. in 1908. After practising in London and at Horbury he went to Haworth, where he continued to practise for twenty-four years, until ill health caused his retirement. He took much interest in public affairs, and was for eighteen years a member of the Haworth District Council, during which time he served on many committees. He was second in command of the Keighley Volunteer Training Corps in 1915, and captain and second in command of the West Riding Volunteers. From 1916-18 he was chairman of the Haworth Military Service Tribunal, and was visiting radiographer at the Keighley and Bingley War Hospital. Dr. Maggs, who was honorary anaesthetist to the Victoria Hospital, Keighley, was appointed a justice of the peace for the West Riding of Yorkshire some three or four years ago. He was a member of the Bradford Division of the British Medical Association. He is survived by his widow and a son.

Medical News.

THE next session of the General Medical Council will commence on Tuesday, November 25th, when the president, Sir Donald MacAlister, Bt., K.C.B., M.D., will take the chair at 2 p.m. and give an address.

THE twentieth South African Medical Congress will open on July 6th, 1925, at Pietermaritzburg. The president is Dr. D. Campbell Watt, the treasurer Dr. A. W. H. Cheyne, and the general secretary Dr. C. G. Kay Sharp, Education Department, Pietermaritzburg. The secretaries of the sections are as follows: Medicine and Mental Hygiene, Dr. W. J. May; Surgery, Dr. H. T. Rymer; Obstetrics and Gynaecology, Dr. H. E. Allanson; Public Health, Dr. Nellie Wall-Mesham; Special Subjects, Dr. E. W. Ingle. Early notification of intention to read papers should be sent to the secretary of the appropriate section.

THE annual dinner of past and present students of the Royal Dental Hospital of London will be held at the Trocadero Restaurant on Saturday, November 22nd, at 7 o'clock, with Mr. W. Warwick James, O.B.E., in the chair.

THE staff of the Royal Dental Hospital of London will hold their annual clinical "At Home" at the hospital, Leicester Square, W.C.2, on Saturday, November 22nd, at 2 p.m. Cases of special clinical interest which have come under observation and treatment during the past year will be shown and demonstrations given. The various departments of the hospital will also be open for inspection. The medical committee extends a cordial invitation to any medical practitioners who may like to attend. Tea will be provided.

LORD DAWSON OF PENN, G.C.V.O., M.D., will read a paper before the Insurance Institute of London on Monday, November 17th, on the need for extended sickness insurance. The place of meeting is the lecture theatre of the School of Oriental Studies, London Institution, Finsbury Circus, and the time 5.30 p.m.

THE Institute for Clinical Research at St. Andrews, Fife, has arranged for a series of papers on renal efficiency to be read on Tuesday afternoons at 4 o'clock. The first was on Tuesday last, when Professor Herring dealt with the physiology of the kidney; he will continue his discussion of this subject on November 18th. Dr. Hynd will discuss the chemical constitution of the urine and blood in health and disease on November 25th and December 2nd, and Dr. Maclennan the clinical pathology of the urine on December 9th and the pathology of the kidney on December 16th. All practitioners are cordially invited to the lectures.

AT the meeting of the Hunterian Society to be held at the Cutlers' Hall, Warwick Lane, E.C., on Monday next, November 17th, at 8.45 p.m., a discussion on the medical witness will be opened by Mr. Justice Horridge and Sir William Willcox, K.C.I.E. The following are expected to take part: Sir Francis Newbolt, K.C., Sir E. Marshall-Hall, K.C., Sir Bernard Spilsbury, Mr. J. A. Cairns (Magistrate, Thames Police Court), Mr. Freke Palmer, and Dr. Spurgin.

A CHADWICK public lecture on "Smoke: cause, nature, effects, and methods of prevention" (illustrated by lantern slides) will be given by Professor J. B. Cohen, Ph.D., F.R.S., on Wednesday, November 19th, at 8 p.m., at the Royal Institute of British Architects, 9, Conduit Street, London, W.

THE annual general meeting of the Medical Officers of Schools Association will be held at 11, Chandos Street, W.1, on Friday, November 21st, at 5 p.m. (tea, 4.30 p.m.), when the president, Dr. L. R. Lempriere, will read a paper on preventive hygiene in public schools, based on twenty years' experience.

THE first meeting of the session of the Yorkshire Tuberculosis Society was held at the Sheffield Tuberculosis Dispensary on October 25th. Dr. Rennie took the chair, and a paper on surgery in the treatment of pulmonary tuberculosis was read by Dr. H. Morriston Davies, superintendent of the Vale of Clwyd Sanatorium.

THE Langley Memorial Prize of the London School of Hygiene and Tropical Medicine has this year been awarded to Dr. P. S. Selwyn-Clarke, M.C., D.P.H., of the West African Medical Service, for his monograph on small-pox in the negro and negroid tribes of British West Africa, with special reference to the Gold Coast Colony. The prize was founded by the friends of the late Dr. W. H. Langley, C.M.G., Principal Medical Officer of Southern Nigeria, to commemorate his work, and this is the first year of award.

THE Harben Lectures, which were to have been given on November 24th, 25th, and 27th by Professor Edgar L. Collis, M.D., on phthisis and industrialism (national and occupational), with reference to other infectious diseases, have unavoidably been postponed.

THE seventh, eighth, and ninth lectures of the series on cancer, open to members of the profession, and arranged by the Fellowship of Medicine, will be delivered in the West Lecture Hall at 5.30 p.m., on Monday, November 17th, by Mr. Cyril A. R. Nitch, on "Cancer of the Intestines"; on Wednesday, November 19th, by Mr. W. Sampson Handley, "Cancer of the Breast"; and on Friday, November 21st, by Mr. H. S. Souttar, "Carcinoma of the Oesophagus." The Chelsea Hospital for Women has arranged a special course from November 21st to December 8th. A four weeks' course, starting on November 24th, will be given at the Royal Waterloo Hospital for Children and Women, in medicine, surgery, and gynaecology, with special reference to diseases of the blood, nervous system, heart diseases, feeding of infants, etc. During the first fortnight in December the Royal Northern Hospital, in conjunction with the Royal Chest Hospital, will hold an intensive course in medicine, surgery, and the special departments; the Infants Hospital, a course on the study of infants; and the Hospital for Diseases of the Skin (Blackfriars), a short course in dermatology, including venereal clinics. Copies of the syllabus of each of the above-mentioned courses may be obtained from the Secretary to the Fellowship of Medicine, 1, Wimpole Street, W.1.

DR. GREVILLE MACDONALD will give a public lecture on "Octavia Hill: her personality and inspiration," at the Royal Society of Arts, 5, John Street, Adelphi, W.C., on Thursday, November 20th, at 5 p.m.

AT a meeting of the National Baby Week Council, on November 12th, a discussion on propaganda work in connexion with ante-natal care was opened by Dr. T. Watts Eden, who dealt with the relation of ante-natal care to maternity and child welfare. Miss Hester Viney, honorary secretary of the Public Health Section of the College of Nursing, spoke on propaganda among mothers, and Mr. E. B. Turner, F.R.C.S., raised the question of the fathers. Dr. Vincent Denne, dental surgeon of the Infants Hospital, Westminster, opened a discussion on propaganda in favour of extending dental clinics for nursing and expectant mothers and for children under 5. At the end of the meeting the council's new film, "The work of an infant welfare centre," was exhibited.

APPLICATIONS for the year 1925 for the Government grant for scientific investigations must be received at the offices of the Royal Society not later than January 1st. They must be made on printed forms obtainable from the clerk to the Government Grant Committee, Royal Society, Burlington House, W.1.

THE following are among the medical men elected on November 10th to the office of Mayor: Dr. G. R. Anderson (Southport), Alderman Dr. C. W. Buckley (Buxton), Alderman Dr. W. J. Cale (Bury St. Edmunds), re-elected, Dr. H. J. Campbell (Dartmouth), re-elected, Alderman Dr. J. W. Clegg (Burnley), re-elected, Alderman Dr. W. I. Fern, J.P. (Congleton), re-elected, Alderman Dr. O. W. Griffith, J.P. (Pwllheli), re-elected, Dr. E. J. Toye (Bideford). As already announced, Dr. G. S. Pope has been elected Lord Mayor of Norwich.

THE College of Physicians of Philadelphia announces that the next award of the Alvarenga Prize, amounting to about 300 dollars, will be made in 1925. Essays may be upon any subject in medicine, but cannot have been published; they must be typewritten and in English, and they must be received by the Secretary of the College, 19, South 22nd Street, Philadelphia, U.S.A., on or before May 1st, 1925. Each essay must be unsigned, but marked with a motto and accompanied by a sealed envelope having on its outside the motto and within the name and address of the author. The prize for 1924 has been awarded to Dr. Gordon Cameron of Victoria, Australia, for his essay on pancreatic anomalies.

DR. WILLIAM BUSBY COULTER, senior medical officer, has been appointed an official member of the executive council of the presidency of Montserrat.

THE Right Hon. Neville Chamberlain, M.P., Minister of Health, has appointed Mr. Douglas Veale to be his private secretary and Mr. A. Novil Rucker assistant private secretary.

WE have to announce, with deep regret, that Dr. G. E. HASLIP died on the afternoon of Wednesday, November 12th, after a long and painful illness. For eight years—from 1916 until last summer—Dr. Haslip held the office of Treasurer of the British Medical Association, and devoted his time and energy and his great abilities to the welfare of the Association. We hope to publish a memoir in our next issue. The first part of the funeral service will be held at St. Martin's-in-the-Fields, Trafalgar Square, to-day (Friday, November 14th), at 11 o'clock; the second part at Walton-on-the-Hill Church.

Letters, Notes, and Answers.

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.* Authors desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Financial Secretary and Business Manager, 429, Strand, W.C.2, on receipt of proof.

ALL communications with reference to advertisements as well as orders for copies of the JOURNAL should be addressed to the Financial Secretary and Business Manager, 429, Strand, London, W.C.2. Attention to this request will avoid delay. Communications with reference to editorial business should be addressed to the Editor, BRITISH MEDICAL JOURNAL, 429, Strand, W.C.2.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—not necessarily for publication.

Communications intended for the current issue should be posted so as to arrive by the first post on Monday or at latest be received not later than Tuesday morning.

THE telephone number of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is Gerrard 2630 (Internal Exchange). The telegraphic addresses are:

EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology Westrand, London.*

FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate Westrand, London.*

MEDICAL SECRETARY, *Mediocera Westrand, London.*

The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone: 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh;* telephone: 4361, Central).

QUERIES AND ANSWERS.

EPILEPTIFORM FITS.

DR. P. MERRIN (Mount Clarence, Kingstown) writes: If "H. C. B." (November 8th, p. 883) will try bromocarpin one teaspoonful in water three times a day before meals and 1/2 grain thyroid extract twice a day after food he will find it of advantage to his patient.

SUGGESTION DURING SLEEP.

"EXPATRIATED" asks for detailed information, or a reference to literature containing it, on how to employ the method of suggestion during sleep in order to assist a child of 13 to overcome certain weaknesses. These include a stoop, for which regular exercises are being done, and a weak memory. Suggestion might, he thinks, be valuable also in removing a dislike to a language the child is learning, the lessons in which are easy in themselves. The father, a medical man, wakes the child every morning; he wishes to know how long a time should elapse between the making of the suggestions and the waking up of the child.

LIQUID PARAFFIN AND CANCER.

DR. A. C. JORDAN (London) writes in reply to "B. K." (November 1st, p. 840) and Dr. S. Watson Smith (November 8th, p. 884): (1) Crude industrial oils contain irritant impurities; these cause cancer. (2) Medicinal paraffin, properly purified, is free from all irritant impurities; it is quite incapable of causing cancer. Hence one question only need be asked: "Are all medicinal paraffins pure?" The reply is, "Yes; all those that are colourless, odourless, and tasteless." So far from causing cancer, medicinal paraffin undoubtedly prevents cancer by rendering the faeces soft, pliable, and non-irritant.

STERILIZATION OF HYPODERMIC OUTFIT.

"E. H." writes: Reading the letter in your issue of November 8th (p. 884), by Dr. W. Johnson Smyth, on rapid sterilization of hypodermic syringe and needle, I would like to inquire if it is quite "safe" to use one of the outfits on the market in which the syringe is kept immersed in an antiseptic fluid. The fluid advised is absolute alcohol, but this being so expensive I have substituted methylated ether and even petrol. Both of these evaporate so readily that it is not necessary to wash with sterile water.

INCOME TAX.

Change of Practice—Cash Receipts.

"A. W." sold his practice at the end of September, 1923. He is now being asked by the inspector of taxes for a statement of account showing the amount of his cash profits for his last six months in order that his successor may be correctly assessed, and also for a statement as to the amount of cash recovered since the practice was sold in order that he may be charged to tax thereon.

*** As regards the first point, if "A. W." does not now possess the necessary records his only course is to say so and leave his successor to come to some arrangement with the inspector as to the assessment; it is, of course, unfortunate that the particulars necessary for a correct assessment are not available. The second point is more serious in its application and has been dealt with in this column more than once. The inspector's suggestion that "A. W." is liable to account for tax on cash now received for past debts involves a misapprehension of the position. He is not liable to assessment in respect of professional earnings except for such periods as he was in the practice which earned those debts. It is true that in the past he has paid tax on the basis of the cash received, but that was merely because, as a matter of mutual convenience, the amounts so received were taken as equivalent to the true gross receipts—that is, to the *value* of the year's bookings.

LETTERS, NOTES, ETC.

THE DOSE OF TRYPAFLAVINE.

PROFESSOR C. H. BROWNING (Glasgow) writes with reference to paragraph 358 on page 66 of the *Epitome* in our issue of November 8th, and suggests that there must be a serious mistake in the recommendation of 5 to 15 grams as the dose of trypaflavine for daily intravenous injection. In his experience the maximum single dose intravenously is about 0.3 gram. He adds that such administration would lead to serious results.

*** The doses given in our abstract were those recommended by the two writers of the original article.

ELECTRIC SHOCK.

DR. J. O'C. FITZSIMONS (Blaina, Monmouthshire) writes: At a Hackney inquest recently on a man who died from heart failure consequent upon an electric shock Dr. R. M. Brontë said there was a case recorded in America where 20,000 volts passed through the body without causing death. I had a case recently in which 20,000 volts at a colliery passed through a man. He recovered consciousness after twenty minutes' artificial respiration. He was none the worse after a few days, except for a large piece of flesh which sloughed from the sole of one of his feet. He was standing at the time of the shock on a dry concrete floor, but totally unprotected as regards gloves or rubber shoes.

ARSENIC IN URINE.

MR. H. E. COX, Ph.D., M.Sc., reporting on November 5th to the Society of Public Analysts, said that the inquiry of the Swedish Commission into chronic arsenical poisoning had been carefully tested, and the conclusion had been reached that the nitric and sulphuric acid digestion process described by Bang and Ramberg gave higher and more accurate results than the older wet combustion method adopted by the Joint Committee of the Society of Public Analysts and the Society of Chemical Industry in 1902. It was found that normal urine might contain quantities of arsenic which had been thought to be associated only with chronic arsenical poisoning; the amounts present in the urine of persons on known diets varied from 0.0 up to 0.58 mg. per litre. An increase in the excretion of arsenic was traceable to the eating of fish, and it had been shown that fish, especially plaice, might contain arsenic up to three parts per million. The eating of such fish led to the appearance of arsenic in the urine within twenty-four hours.

THE M.D.BRUX. DEGREE.

DR. ARTHUR HAYDON (2, Crossfield Road, N.W.3), Hon. Secretary, Brussels Medical Graduates' Association, informs us that he has recently had interviews with the University authorities in Brussels regarding the M.D. degree for foreigners. He has ascertained that all candidates will be required to submit their degrees or diplomas for consideration to the Secretary of the University, and be prepared to spend at least one year at the University by attending the lectures, clinics, and practical work before being allowed to enter for the examinations. These are conducted in French, viva voce. The degree does not confer the right to practise in Belgium. The period of residence required will vary according to the standard of the diploma submitted by the candidate for the consideration of the University authorities. The fees for the year are: Courses, 525 francs; laboratory work, 250 francs; examinations, 110 francs.

MISSING NUMBERS.

DR. J. ALLMAN POWELL, Hon. Secretary, Cheltenham Medical Library, writes: I am anxious to obtain the following copies of the *Lancet* to complete the collection of this library: July 26th, 1919; December 6th, 1919; February 7th, 1920; March 27th, 1920; April 10th, 1920; October 23rd, 1920; November 5th, 1921; August 26th, 1922; May 12th, 1923; May 24th, 1924. I would be very grateful if any of your readers could let me have any of these numbers.

CORRECTION.

DR. MORRIS J. COHEN (Liverpool) calls attention to the incorrect spelling of his name in the reports of the discussions on post-operative pulmonary embolism published in the JOURNALS of August 2nd (p. 184) and November 8th (p. 856).

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 36, 37, 40, and 41 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 38 and 39.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 187.